THE POLAR TIMES

The Transantarctic Mountains protrude through the east antarctic ice sheet near the Beardmore Glacier.

NSF photo by Ann Hawthorne.

Panel seeks help with arctic policy

The Anchorage Times

Copies of the one-half page U.S. Arctic Research Policy proposed by The Arctic Research Commission were distributed recently at a public meeting in Seattle.

The policy reiterates information included in the Arctic Research and Policy Act of 1984 and serves as the first step in development of research priorities for the North.

"The Commission believes that Arctic research policy should flow from concerns expressed in the Arctic Research and Policy Act and policy guidance provided by National Security Decision Directive Number 90, which establishes U.S. Arctic policy," says Timothy Hushen, executive director of the Los Angeles based U.S. Arctic Research Commission.

In the nine months since conception, the ARC has conducted, public meetings in Anchorage, Fairbanks, Seattle, Barrow and Prudhoe Bay.

"Information obtained from these meeting are incorporated in the policy," says Hushen.

The Arctic Research Commission is a presidential commission created with passage of the Arctic Research and Policy Act of 1984. As prescribed by the legislation, the five members have expertise in science and/or business with one member of the Alaska native community.

Members of the commission are J.H. Zumberge, scientist and president of University of Southern California in Los Angeles; Juan Roederer, director of the Geophysical Institute at University of Alaska, Fairbanks; Oliver Leavitt, Barrow resident and chairman of the Board of Alaska Federation of Natives; Elmer Rasmuson, chairman of the executive committee at National Bank of Alaska, and A. Lincoln Washburn, professor emeritus of geological sciences and Quaternary Research Center at the University of Washington in Seattle.

The Polar Times

Published June and December by the AMERICAN POLAR SOCIETY, August Howard, Secretary, 98-20 62nd Drive (Apt. 7H), Rego Park, New York 11374

AUGUST HOWARD, Editor

THE POLAR TIMES highly recommends "The Polar Record," published by the Scott Polar Research Institute, Cambridge, England.

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are $2.00 a year or $5.00 for 3 years, which entitles members to receive THE POLAR TIMES twice a year.

The American Polar Society is classified as a tax exempt organization under Code Section 509 (a) (2)

Greenland Under Thin Ice

It has long been assumed that the ice sheets of Greenland and Antarctica were thicker in the ice ages than today, but an analysis of ice obtained by drilling to bedrock through the crown of the Greenland ice sheet and through the ice cap on Canada's Devon Island suggests that the ice may actually have been thinner.

Such drilling has reached layers of ice formed in the last ice age and has shown it to be considerably softer than ice formed more recently from annual snow accumulations. According to Niels Reeh of the Geological Survey of Greenland, ice formed in the ice age flows three to four times more readily than that above it. This, he reports, has been confirmed by deformation tests on the ancient ice.

Such greater plasticity could help explain why, some 12,000 years ago, the ice flowed far enough south to gouge smooth troughs in the rocks of New York City's Central Park.

Even though the ice sheets became extensive, because the ice flowed more readily than today their central regions shed the accumulation rapidly. As time passes the underlying layer of more plastic ice becomes thinner and the modern, slower-flowing ice above it becomes thicker.

As a result, Mr. Reeh proposed in a recent issue of Nature, the rate at which ice flows to the sea is slowing down. Consequently the ice covering Greenland is becoming a half inch thicker each year and the Devon Island ice has thickened 15 percent. While he pointed out that other factors, such as temperature and snowfall, help determine ice accumulation, he suggested that the thickening trend in central Greenland should persist "for thousands of years."

Softness of the ancient ice has been attributed to the smaller size of its crystals and their more vertical orientation. The ice is also more contaminated with particles. The ice ages were marked by extensive dust storms that covered much of the Middle West with fine-grained material known as loess.

Norway Bans Arctic Plans

OSLO, Nov. 17 (Reuters) — Norwegian authorities have effectively banned further oil and gas drilling operations this winter in its northern waters, calling exploration rigs off northern Norway unfit for harsh Arctic conditions.

The state-funded Norwegian Petroleum Directorate's decision to stop Arctic operations by the Exxon Corporation and the Royal Dutch/Shell Group halted what would have been the first winter drilling season off Norway's rugged northern coast.

The directorate said exploration rigs normally used in the North Sea had not been prepared for the hurricane-force gales and icy conditions in the Norwegian Sea.

Exxon's Norwegian subsidiary has protested, saying it had spent considerable sums modernizing its rig.

A safety official said the decision was not intended to spell an end to the Government's plan to open northern waters to winter exploration, but he criticized oil companies for using unsuitable rigs there.

Norway, which produces about 850,000 barrels of crude oil a day, is looking to Arctic discoveries to maintain production levels when its North Sea fields begin to decline.

AMERICAN POLAR SOCIETY

DR. NED OSTENSO
President

DR. RICHARD L. CHAPPELL
DR. JOHN H. ROSCOE
WALTER SULLIVAN
Vice Presidents

AUGUST HOWARD
Secretary

DR. WILLIAM O. FIELD
Treasurer

Board of Governors

ROBERT B. ATWOOD
WILLIAM B. BEATTY
PROF. WILLIAM S. BENNINGHOFF
MALCOMB W. BROWNE
JOSEPH A. BRUNTON, JR.
DR. RICHARD L. CAMERON
DR. JOSEPH M. CHAMBERLAIN
DR. ALBERT P. CRARY
WALTER H. DODD
GORDON FOUNTAIN
HERMAN R. FRIIS
EDWARD E. GOODALE
DR. LAURENCE M. GOULD
ARNOLD M. HANSON
DR. WILLIAM R. HUNT
DR. WALDO K. LYON
CAPT. DAVID C. NUTT
CHARLES E. PASSEL
DR. MARTIN A. POMERANTZ
MICHELE E. RANEY, M.D.
MRS. EDITH RONNE
DR. THEODORE SHABAD
DR. ALAN H. SHAPLEY
MRS. PAUL A. SIPLE
CHARLES H. STOLL

The Polar Times

No. 101 DECEMBER 1985

Arctic night envelops slope

by Dean Fosdick
Associated Press

PRUDHOE BAY — When the sun disappears beneath the frigid, wind-swept horizon of the North Slope tundra today, it will be gone for 56 days — not to reappear until Jan. 18.

The Land of the Midnight Sun in summer is also the Land of the Long Arctic Night in winter.

For the next couple of months, the few thousand or so people who inhabit this flat, treeless arctic desert will be working in a daytime twilight. It's a period of time just a few hours long that is more gray than black, but more night than day.

Headlights and office lights will burn around the clock. But it will be business as usual at Prudhoe Bay, some 250 miles north of the Arctic Circle, and 1,500 miles south of the North Pole. Sprawled along the edge of the Arctic Ocean, it's the largest oilfield yet discovered on the North American continent.

Donna Ford, a security guard, says, "Life goes on. Work goes on. You just look at your watch more often."

Ford, who lives near Anchorage, says it's just the reverse during the brief arctic summer. That's when the sun brings perpetual daylight for more than two months.

"My first year up here, 5½ years ago, I probably didn't get more than three hours of sleep a night," Ford said. "You'd be talking and looking at your watch, and it would be three in the morning."

ARCO Alaska Inc. operates the eastern half of the giant oilfield as well as the neighboring Kuparuk River field, 40 miles to the west. The company shuttles more than 1,000 employees through rotating shifts of seven days on and seven off.

They work 12-hour days during their week on the slope, but flexibility is built into the system during winter.

John Marshall, assistant director of the public safety department responsible for seven outlying communities scattered throughout the North Slope Borough's 88,000 square miles of territory, says the crime rate doesn't seem to fluctuate much when the sun stays down.

"People remain people," Marshall says. "The crime rate may go up a bit toward the end of winter when people try to shake off their cabin fever. But it's my feeling that crime has more to do with unemployment and paydays than the phases of the moon or the amount of light during the day."

In Anchorage, daylight hours will continue to taper off until winter solstice, Dec. 21. On that date, the city will see about five hours and 28 minutes of sunlight.

'Use it or lose it,' official says of Arctic

OTTAWA (AP)—If Canadians don't use the Arctic, they're going to lose it, University of Toronto professor Franklyn Griffiths has warned.

"We've got to get up there. We've got to put up or shut up about our Arctic sovereignty," Griffiths told a panel discussion on the voyage of the U.S. Coast Guard icebreaker Polar Sea through the Northwest Passage.

"To put it simply, use it or lose it for these waters."

The Seattle-based Polar Sea, which entered Canada's northernmost waters in August, has rekindled debate over Canada's sovereignty in the Arctic.

Canada considers the waters surrounding the Arctic islands as internal waters and under international law such waters are part of the sovereign territory of a country.

But the United States says the Northwest Passage is an international strait, part of the high seas. For that reason, it did not ask Canada's permission to undertake the voyage although it did give notification of its plans in May.

Griffiths, the political science professor who broke the story of the voyage, said he expected public opposition to be stronger, along the lines of the response to the 1969 voyage of the Manhattan, the American oil tanker which became the first commercial vessel to travel the Northwest Passage.

Tom Pullen, the former navy captain who was Canada's official representative on the Manhattan, said he thinks Canadians are overreacting to the Polar Sea.

The government may have long-term plans for the Arctic which are not hampered by this single trip, he said.

Griffiths said Canada's reaction to the voyage has been inadequate, ineffective and unworthy of a country trying to maintain its security.

He recommends Canada find countries or corporations interested in year-round shipping through the Northwest Passage.

Pullen, with the unanimous support of other panelists, said Canada needs to build an icebreaker capable of patrolling Arctic waters year round.

Arctic caribou increasing

JUNEAU (AP) — The Western Arctic caribou herd has been growing rapidly in size for the past 10 years, according to the state Department of Fish and Game.

The herd's numbers now exceed 200,000 animals, officials said. That's up from a low of 75,000 caribou in 1975.

Caribou increase their range as their herd size increases, officials said. Thus far this winter, caribou from the Western Arctic herd have been seen from Bettles to the southern portion of the Seward Peninsula.

Those are traditional ranges that the caribou haven't used in years, officials said.

The Western Arctic caribou herd provides meat and hides for residents of 25 or more villages during its annual migration across northwest Alaska, the state said.

Navy studying sound waves under strategic polar icecap

LOS ANGELES (AP) — The Navy has launched a scientific study of the Arctic region, an area where Soviet and American submarines could play a critical role in any military confrontation between the two superpowers.

Soviet and U.S. submarines have stepped up their cat-and-mouse game below the polar icecap, spurred by recent fears that the Soviets may have the capability to launch missiles toward previously unreachable targets in the United States.

Much of the five-year research program will focus on how sound travels from one point to another under the polar icecap, James Wilson of Los Angeles, chief scientist on the government-funded project, said last week.

Below the icecap, sound waves are guiding beacons for submarines that roam through treacherous underwater formations called "ice keels," often extending 150 feet deep.

The uneven features below the ice and other characteristics make sound waves behave differently under the icecap than in the open ocean, often clouding the image provided by sonar equipment.

"The transmission of sound is just totally different there," said Wilson, a physicist and oceanographer. "It's just a completely different world."

Scientific exploration of the Arctic has remained limited since the historic voyage of the Nautilus, the world's first nuclear-powered submarine. The Nautilus passed under the North Pole on Aug. 3, 1958, in a voyage from Pearl Harbor, Hawaii, to Portland, England.

Navy submarines have operated in the Artic since that time, and those operations under the ice have been stepped up in recent years, since the introduction of a new generation of Soviet submarines designed to break through the ice.

But "the Arctic has been a scientifically ignored area," said Wilson, who added that past expeditions have been of a "survival nature."

Wilson and other scientists spent six weeks last spring near the North Pole beginning their research. And they plan to return next spring, the only time of the year they can do their research.

"We're on the frontier of understanding what makes the Arctic work," Wilson said.

Wilson and his co-workers drilled holes in massive ice fields and set off underwater explosions to study sound waves below the ice. This spring's research also involved gray whales, which travel under the ice. The whales surface frequently in scattered areas of open sea to breathe.

Wilson said he suspects that whales, like submarines, rely on sound waves for direction, but "it's a complete mystery to us right now."

And if whales do rely on sound waves, they also understand how those waves differ in the far north, an ability Navy planners would like to give to listening devices aboard submarines.

Norway Will Increase Efforts to Secure Svalbard as a Community:

Development and Preservation of Svalbard

"Svalbard is a unique and impressive area with a nature and an atmosphere which cannot be experienced in mainland Norway," Prime Minister *Kåre Willoch* said August 14th in Longyearbyen on a visit celebrating 60 years of Norwegian sovereignty in the archipelago.

Mr. Willoch headed an official delegation of nearly 100 persons who were flown to the island in a chartered plane on August 14th, the date when in 1925 Norway was given sovereignty over Svalbard. Among the distinguished guests were representatives of the Government, Storting and Supreme Court, and former governors of Svalbard.

At the monument to those who gave their lives to defend the islands during World War II, Mr. Willoch remarked that "no one has assumed more demanding tasks or contributed more to our freedom than our fellow-citizens who fought and lost their lives at Svalbard."

The Prime Minister reminded his listeners that the Svalbard Treaty of 1920, to which 40 nations are now party, forbids the establishment of naval bases or forts on the islands, which are not to be used for purposes of war. There is agreement in the Storting, however, that mining should continue on Svalbard since it provides the basis for a viable community, and that research should continue and increase.

By the Treaty of Svalbard of 9 February 1920 Norway was granted sovereignty over Svalbard and the territorial waters of the archipelago.

The Svalbard Act of 17 July 1925 declares that Svalbard is part of the Kingdom of Norway.

News of Norway

Satellites Are Eyes in Sky for Wildlife Studies

ANCHORAGE, Sept. 21 (AP) — When caribou No. 5871 beds down for a nap on the tundra, Larry Pank knows it, 400 miles away in his Fairbanks office.

A fist-size transmitter on the caribou's neck and a pair of satellites in space chart the animal's every movement as it migrates across northeastern Alaska.

"With some degree of reliability, we can tell if he's standing, lying, running or walking," said Mr. Pank, a biologist with the United States Fish and Wildlife Service. "The amount of data you can collect from this is amazing."

Using a computer, Mr. Pank can pin down the caribou's location to within 1,600 feet. A thermometer in the transmitter tells him the approximate air temperature. A motion-sensing switch detects how many times, and to what degree, the animal moves its head each hour.

Safer and Cheaper Tracking

Tracking animals with data relayed by satellite has enabled Mr. Pank and researchers all over the world to study wildlife in ways never before possible. Not only can satellites chart a gray whale's wanderings in the Pacific, they can also tell how often and how deep it dives. They can follow African elephants across hostile borders closed to biologists.

The use of satellites also makes routine tracking tasks safer and less expensive. Biologists have long used radios to track wildlife, but a radio transmitter's limited range forces researchers into the field, which often means flying over remote country, in all seasons and weathers.

"They're going out in the worst environments — people get killed," said David Beaty, a partner at Telonics Inc., a manufacturer of animal-tracking devices. "Now they can sit back at their computer and collect two to six position fixes a day, and we don't lose any scientists."

Telonics, of Mesa, Ariz., has designed transmitters to fit humpback whales off Newfoundland, red deer in New Zealand, manatees in Florida, polar bears and musk oxen in Alaska, and many others.

Research on the North Slope

Satellite tracking is especially useful on Alaska's North Slope, where researchers are hurrying to study the environmental impact of oil and gas development.

Since last spring Mr. Pank and other scientists with the Fish and Wildlife Service and the Alaska Department of Fish and Game have been monitoring a herd of 150,000 caribou, the Porcupine Herd, which migrates between the North Slope and Canada's Yukon Territory.

They captured 10 animals, fitted them with transmitter collars and returned them to the herd. Now, about 25 times a day, one of two weather satellites streaks overhead hour picking up signals from the transmitters.

The messages are recorded, then transmitted to earth as the satellite passes over a ground receiver in the interior of Alaska. The data are relayed to Toulouse, France, where the French national space agency translates the encoded messages and stores them on computers for retrieval by the researchers.

Transmitters Cost $3,000

Experiments with satellite tracking of animals began in the early 1970's, Mr. Beaty said. The satellites were ready; the trick was to make transmitters powerful enough to reach into space yet small enough not to impede the animals.

There have been setbacks. Fish and Wildlife scientists last year tried solar-powered transmitters on swans in Alaska, but the transmitters failed in the cold.

But successes are starting to outnumber failures. Telonics says it has had a perfect record for three years with transmitters used on land animals. Also, the transmitters are shrinking in size and cost. The ones used on caribou, for example, now sell for $3,000, down from $12,000 two years ago.

Mr. Pank says that is a bargain. A comparable caribou study using radio transmitters would cost the Government five times as much, mostly for aircraft charters, he estimated.

South Pole Satellite

Two Government agencies, two universities and several commercial manufacturers have joined forces to give scientists stationed at the South Pole a reliable satellite link to the outside world.

According to an announcement by the National Aeronautics and Space Administration, an old satellite, the ATS-3, has been pressed into service for polar communications. The ATS-3 was launched in 1967 and has run out of maneuvering fuel, but is useful for relaying communications. ATS-3 is visible to both the University of Miami in Florida and the South Pole for about four hours every day, permitting data and voice transmissions between the two points in that period.

NASA cooperated with the National Science Foundation, the Universities of Texas and Miami and several aerospace companies that donated equipment to set up several new Antarctic communication links, including the one carried by satellite ATS-3. The combined cost of these projects was $250,000, a fraction of the cost involved in orbiting a new satellite.

Although the the United States South Pole Station operates various radio systems, radio is generally unreliable on the South Pole.

C.J. MacGregor, Forecaster, Dies

The New York Times/Oct.2, 1985

Clifford J. MacGregor, who led a pioneering expedition to the far north to show that Arctic weather had a strong effect on other parts of the world, died yesterday at the Wayne Memorial Hospital in Honesdale, Pa., after suffering a stroke. He was 80 years old and lived in Beach Lake, Pa.

Mr. MacGregor, who served in the Weather Bureau in Alaska in the early 1930's, became convinced that most of the weather conditions in the United States were a result of polar air masses moving south and interacting with warmer air.

He believed that the establishment of weather stations in the northern regions would make it possible to forecast weather two months in advance and even seasonally instead of 36 hours to 48 hours ahead of time.

To prove his idea, Mr. MacGregor took a leave from his job in 1937 as a United States Weather Bureau meteorologist in Newark to lead a major expedition in the Arctic.

The expedition left New York on a three-masted schooner, the General Adolphus W. Greeley, and spent the winter frozen in the Arctic ice. From its base on the ship and in a camp ashore the expedition sent back daily wireless reports on the conditions found.

The findings led to the establishment of a network of bases to monitor northern weather.

Mr. MacGregor went on to serve in the Navy World War II and rose to the rank of captain. He helped to establish bases first in Greenland to help fight the battle in Europe and later in Siberia in preparation for a planned invasion of Japan.

Mr. MacGregor is survived by his wife, Gertrude; a son, Clifford Jr. of Henderson, N.C. and a daughter, Martha Genevieve Razik of Ridgewood, N.J.

Greenland halibut

Greenland will issue a 10-krone stamp depicting the Greenland halibut Oct. 10.

The two-color stamp was designed by Jens Rosing and engraved by Arne Kuhlmann. It was printed by intaglio by the Danish Post and Telegraph Office.

Eskimos View Radar Stations as Blots

By CHRISTOPHER S. WREN
The New York Times

FROBISHER BAY, Northwest Territories — When the United States and Canada announced plans last spring to overhaul the North American air-defense system, the news evoked little enthusiasm from the people who live in the region.

The Talk of Baffin Island

The Baffin Islanders, who inhabit the barren, mostly Arctic island between the Canadian mainland and Greenland, felt as if they had seen it all before.

The radar stations of the original Distant Early Warning line, or DEW line, were built in the 1950's to give advance notice of Soviet bomber attack. Although the system changed the face of the Arctic, creating new communities in the Baffin region like Hall Beach, it did not usher in the prosperity and jobs expected by the Inuit, as Canada's Eskimos are called. Technicians imported from the south have done most of the work.

"It's going to create some short-term employment, for sure, but as far as long-term employment is concerned, I doubt it very much," said Louis Tapardjuk, the president of the Baffin Regional Inuit Association, as he discussed the new system.

Automation Replaces Workers

The modernized warning system will include a network of new long- and short-range radar stations overlapping across Alaska and northern Canada, including several stations on Baffin Island.

Frobisher Bay, Baffin Island's largest town, may also get a logistical support center and an upgraded airport runway to accommodate jet interceptors.

But of the 528 people employed on the present DEW line, only 18 are natives. The new system will need even fewer people, perhaps only 150, because the short-range stations will be automatic.

The Eskimos have worried that the fragile Arctic environment might be polluted by polychlorinated biphenyls, or PCB's, left at dismantled DEW line stations. The toxic chemical is used as a coolant.

Traces of PCB's have been found in the tissues of polar bears, seals and fish, though the source is unclear. The Canadian Government has started a $370,000 cleanup of PCB from 24 abandoned DEW line sites.

After the new warning system was announced, the Baffin Islanders were upset by a report that small nuclear reactors would run the short-range radar stations. They said they feared a radioactive leak would contaminate the wildlife they rely on for food.

Government spokesmen went on the radio to assure everyone that conventional diesel generators would be used. Even so, said Jim Bell, who works for Baffin Island's weekly newspaper, The Nunatsiaq News, "People are worried about how the small warning stations will be powered."

The New York Times/Aug. 17, 1985

Frobisher Bay has 2,500 residents.

•

Such incidents underscore the extent to which a remote region like Baffin Island, which is as far north of Montreal as Florida is south, has become vulnerable to modern realities.

Frobisher Bay, less than 200 miles below the Arctic Circle, was named for Sir Martin Frobisher, an English swashbuckler who arrived in 1576 under the misapprehension that he had found the Northwest Passage to Asia.

The town itself, which now has about 2,500 inhabitants, sprang up when the United States built an airfield to refuel planes ferrying supplies to Europe during World War II.

"Frobisher Bay wouldn't be here if the Americans didn't need it," said John Rizzotto, the town manager. The Americans pulled out in the early 1960's, but a couple of junkyards are still called the "American dumps."

Frobisher Bay's hasty wartime origins are still obvious. Weatherbeaten buildings are scattered along the shore. The Government often changed its style of row housing, but old-timers can look at a building and tell its vintage. Only a small Anglican cathedral, built of wood to resemble an igloo, graces the scene.

Not a Place for Trees

Government offices are ensconced in a fortress-like concrete high-rise on the top of the hill, prompting local quips about climbing cap in hand to seek Government largesse.

Frobisher Bay lies too far north to support a tree. Mayor Bryan Pearson imported some grass seed and sheep manure from Montreal a few years ago. But his attempted greening of Frobisher Bay touched off one of the town's memorable controversies, because the seed and manure cost over $500.

The town's beauty in the short summer lies in bright purple wildflowers that carpet the tundra and the mellow sunsets that flare into sunrises.

To enhance the region's Eskimo character, the town council voted last year to change the name of Frobisher Bay to Iqualuit, an Eskimo word that means "fish." The Federal Government is still studying the idea.

•

The most talked-about topic on Baffin Island is the cost of living here, which runs at least 40 percent higher than in southern Canada. Most supplies, down to white fiberglass panels for the prefabricated schools, arrive aboard four or five ships, which ride in on the 30-foot tide in the summer and are unloaded when the low tide beaches them. Perishable goods must be flown in, and a head of lettuce in midwinter can cost more than $3.

Spare parts get expensive or scarce, so the Eskimos, who make up the great majority of Baffin Island's population, lavish ingenuity on their snowmobiles, which have replaced dogsleds.

"Stories circulate about the jury rigging of Ski-doos with caribou bones and sinews," said Ron Mongeau, who estimated that a tenth of the snowmobiles in Frobisher Bay were kept running with such improvised parts.

Yet Eskimos have had trouble getting licensed as mechanics, because they could not pass a written English test drawn up in southern Canada.

Mr. Mongeau, who is the executive officer of the Baffin Regional Council, said his organization finally pushed through its own licensing criteria so that self-taught mechanics are now tested and recognized where it matters in the Arctic — on the job.

•

The improvisational nature of life on Baffin Island extends to the television shows pulled in by Frobisher Bay's satellite dish, which taps channels from British Columbia, Alberta, Ontario, Quebec and Newfoundland.

But the most popular show on Baffin Island, according to Aimo Aimo Nookiguaq, the manager of the Inuit Broadcasting Company, is a locally produced current-affairs program called "Qagik." The word in Inuktitut means the entrance to an igloo.

When television carried the pictures of Ethiopians starving on the other side of the world, the response from the Eskimos was startling.

Frobisher Bay organized auctions of everything from homemade cakes to painstaking soapstone carvings donated by Eskimo artisans. It collected more than $31,000, a lot of money for a small town with many families on welfare.

In the hamlet of Pangnirtung, which raised more than $4,500, Meeka Kilabuk knew friends who wanted to catch a seal and send it as food to Africa or who offered their sealskin boots to keep Ethiopian children warm.

Walrus deplete food supplies

Fairbanks (AP) — Walrus populations ballooned to record levels this decade, but may be declining because of food shortages and increased hunting, says University of Alaska researcher John Sease.

Sease, of the university's Biology, Fisheries and Wildlife Department at Fairbanks, was participating in the three-day 1985 Arctic Science Conference.

Walrus are large marine mammals distantly related to seals. Adult bulls can weigh almost two tons. Newborn calves weigh between 100 and 160 pounds. Walrus are mostly known for their long tusks and bushy muzzles.

They are also important food for coastal and island villagers in the Bering and Chukchi seas, where they're hunted each spring. Two separate walrus populations live in Alaska waters. One winters in the Bristol Bay region and the other winters southwest of St. Lawrence Island, off the Siberian coast.

It is believed the populations were severely depleted immediately after the Civil War when Yankee whaling ships sailed the Bering Sea. The whalers probably cut the walrus populations in half, from 200,000 to 100,000 animals, Sease said.

The populations recovered by 1900, but commercial harvests in the 1930s reduced their numbers again.

"Since then, they have recovered rather spectacularly," Sease said.

In 1955, there were probably about 100,000 walrus and today there are probably in excess of 250,000 — and that's too many, he said.

The animals are depleting their food stocks, he said.

Fewer walrus are born each year and fewer are surviving, he said. Eskimo hunters report walrus calves are harder to find. That coincides with researcher data that shows drastically lowered numbers of calves and young walrus in relation to numbers of females.

In the mid-1970s, fish, seals and other animals started showing up in the stomachs of walrus killed by Eskimo hunters. That indicated clams, the walrus' standard food, were in short supply. The average blubber thickness of walrus began to decrease also, another indication that food was becoming scarce, Sease said.

During the past five years, the annual kill of walrus by Alaska Eskimos and Soviet hunters has almost reached the levels seen in the 1930s, which concerns walrus biologists, Sease said.

It's Bleak and Barren, But Not to the Eskimos

By CHRISTOPHER S. WREN

FROBISHER BAY, Northwest Territories — An Eskimo homeland may seem a curious goal to those who conceive of the Arctic as a frozen wasteland. But that is the aim of the Inuit, as Canada's 25,000 Eskimos call themselves.

It is called Nunavut — "our land" in the Inuktitut language they speak. The homeland could encompass an area much larger than Alaska if all their traditional lands were included. The Canadian Government has already agreed in principle to carve Nunavut out of the Northwest Territories and has even set a target of 1987 for its creation. Only the details have been intractable.

Nunavut makes a certain amount of geographic sense. The Northwest Territories include what was left over after the provinces of southern Canada were created. More than 18,000 of the territory's 49,000 inhabitants are Eskimos, living mostly in the eastern Arctic; the rest are Dene, or Indians, and whites. And even after the government of the Northwest Territories moved from Ottawa to Yellowknife in 1967, Frobisher Bay, the largest town in the eastern Arctic, was still more than 1,400 miles from the new capital. There are only two airline flights a week from Yellowknife to Frobisher Bay, as compared with nine from Montreal, 1,200 miles to the south.

While other residents of the Northwest Territories may view the Federal Government with suspicion, the Eskimos in the eastern Arctic tend to feel doubly estranged. "The enemy is Yellowknife and Ottawa," said Jim Bell, who works for the Nunatsiaq News, Baffin Island's weekly newspaper. "People here feel ignored and misunderstood, particularly by southern Canadians but also by Yellowknife."

Resentments have been fueled by a bureaucratic paternalism, sometimes from Yellowknife but more often from Ottawa. Some say white civil servants tend to ignore the elders who run Eskimo society because they hold no formal office and may not even speak English. Before the white man intruded, the Eskimos lived north of the treeline, the Indians south of it. "Geographically, culturally and ethnically, there is a unique Indian territory and a unique Inuit territory," said Ron Mongeau, the executive officer of the Baffin Regional Council. "The needs and aspirations are so different that there is no way a central territorial government can deal with it."

The Eskimos began pressing for their own home more than a decade ago. In 1982, inhabitants of the eastern Arctic approved by 4 to 1 a proposal to split the Northwest Territories in two, with Nunavut in the east. Last February, Ottawa gave approval to a tentative boundary worked out a month earlier by delegates from both east and west. But negotiations stalemated after the the Eskimos living along the northwestern Beaufort Sea objected to being left out of the homeland. Nor did the Indians and whites in the west want a boundary that took away the Beaufort Sea, with its oil, and left them with less than a third of the Northwest Territories.

Even if that problem is resolved, others remain. Frobisher Bay, the likeliest capital of Nunavut, is even more distant from some communities in the central Arctic than is Yellowknife. Government offices could be divided among various communities, but this could create a costly logistical problem. Beyond this, some southern Canadians worry where Nunavut could lead. Advocates have developed close relations with the Eskimos in Greenland and Alaska through an Inuit Circumpolar Conference.

The Eskimos have assured Ottawa that Nunavut will be just a territory, and perhaps eventually a province. "We've tried to find a way to place the Nunavut concept within the Canadian federal system in a nonthreatening way," said Peter Jull, an adviser to the conference. But the idea of a homeland also appeals to the Eskimo minorities in Quebec and Labrador. Mark R. Gordon, an Eskimo leader in northern Quebec, said that "we've limited ourselves to talking about an autonomous region in Quebec, although we are very eager for Nunavut to be formed."

Artist Gerhard Kleist is honored on a 9-krone stamp to be issued by Greenland Sept. 5.

Kleist, who lived from 1855 to 1931, painted scenes of catch, such as catching narwhal through openings in the ice and catching small game.

The watercolor depicted on the stamp shows hare hunting.

Low Ozone Level Found Above Antarctica

By WALTER SULLIVAN

Satellite observations have confirmed a progressive deterioration in the earth's protective ozone layer above Antarctica, according to scientists who analyzed data recently sent back from space.

Each October, the data show a "hole" appears in the ozone layer there, scientists say, and each year the layer in that area becomes less able to shield the earth from damaging solar ultraviolet rays.

Since 1974 scientists have been predicting a gradual depletion of stratospheric ozone as a result of increased pollution of the atmosphere. The new data have persuaded some researchers that the ozone loss is proceeding much faster than expected.

Link to Skin Cancer

It has been predicted that a significant depletion of the ozone layer would substantially increase the rate of skin cancer worldwide. Even under normal conditions, however, the ozone layer is subject to wide variations, and whether the recent depletion is part of a long-term trend is difficult to establish.

Several substances introduced into the atmosphere as pollutants are suspected of contributing to the depletion, chief among them fluorocarbons, such as the Freon used for refrigeration, and methane, nitrous oxide and a variety of bromine compounds.

The satellite measurements indicating a rapid decrease over Antarctica have been made by two devices riding the Nimbus-7 satellite, which was launched in 1978. Dr. Donald F. Heath of the Goddard Space Flight Center in Greenbelt, Md., who for several years has been monitoring the recordings, said yesterday a quick look at last month's data indicated that the decline is continuing.

In his view, however, the reason for it remains uncertain. It was first blamed on sulfur compounds and other particles ejected into the stratosphere by the 1982 eruption of El Chichon in Mexico.

Scientists Backs Theory

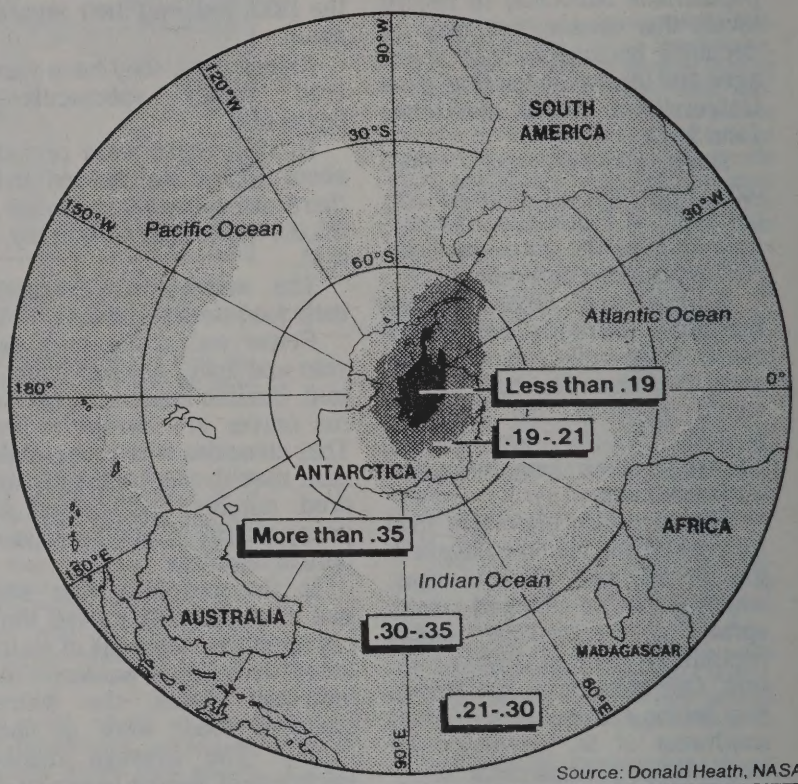
This explanation was also advanced by H. U. Dütsch of the Federal Institute of Technology in Zurich, Switzerland, based on ozone measurements at Arosa in the Swiss Alps.

The measurements there, as at numerous other ground stations, are based on recording two wavelengths of sunlight. Ozone absorbs sunlight at one of the wavelengths, so the relative strength of the two wavelengths is an indication of how much of the gas is in the atmosphere. The 1983 average was the lowest in 60 years. If that was entirely caused by material from El Chichon, Dr. Rowland said in a recent interview, the level should now be returning to normal, but it is not.

According to Dr. Heath, however, there are other possible explanations. The decrease could be linked to the sunspot cycle, which is now near a minimum. According to a study by NASA scientists, the chemical reactions that produce stratospheric ozone are stimulated by a form of ultraviolet radiation that becomes weak when sunspots are fewest.

Decrease in Ozone over Antarctica

Measurements from the Nimbus 7 satellite have shown a "hole" in the ozone layer over Antarctica. These, recorded on Oct. 4, 1983, and now confirmed, indicate ozone abundances in terms of how deep a layer would be formed by the gas, in centimeters, at normal atmospheric temperature and pressure. In addition to the depleted area near the South Pole, there is a persistent high concentration south of Australia.



Source: Donald Heath, NASA

The New York Times/Nov. 7, 1985

Unusual Conditions Noted

Nor is it clear, Dr. Heath said, whether the Antarctic readings manifest a local change in atmospheric circulation, rather than a global depletion. The condition of the winter atmosphere over Antarctica is not matched anywhere else. The atmosphere, immersed in the polar night, remains highly stable and becomes extremely cold. Then, when spring comes to the Southern Hemisphere about October, it is suddenly bathed in sunlight and, it is hypothesized, ozone depletion runs at full speed.

According to the report observations at Halley Bay in Antarctica, "Comparable effects should not be expected in the Northern Hemisphere where the winter polar stratospheric vortex is less cold and less stable." The report, published earlier this year in Nature was by J. C. Farman, B. G. Gardiner and J. D. Shanklin.

That fluorocarbons are responsible for the newly observed depletion of the ozone layer has been proposed by scientists of the British Antarctic Survey, based on observations conducted since 1957 at Halley Bay, and by Dr. F. Sherwood Rowland of the University of California at Irvine. It was Dr. Rowland, Dr. Mario J. Molina and Dr. Harold Johnston who in 1974 first warned of such a danger.

In 1980 a committee of the National Academy of Sciences concluded that the projected ozone depletion, through increased ultraviolet radiation, could increase skin cancer, curtail crop production and destroy the larvae of some marine organisms. A 16 percent ozone reduction, it said, would probably produce each year "thousands" of additional cases of melanoma — the most lethal skin cancer.

Effect of Ban

In 1977 a ban was imposed on fluorocarbons as spray-can propellants, but it became evident that the ozone varies in response to a variety of interacting natural and human influences. By 1984 an academy report estimated ozone reduction, due to fluorocarbons, at only 2 percent to 4 percent.

An annual 20 percent increase in the atmospheric content of bromine com-

President's message highlights midwinter celebrations

On 21 June 1985, 115 U.S. citizens wintering at McMurdo, Amundsen-Scott South Pole, and Palmer stations received Midwinter's Day greetings from President Reagan.

In this year's message President Reagan commended the wintering community for accepting a challenge "to show the world that citizens of many nations can work together in peace." The President's message also was sent to personnel at 31 other antarctic stations operated by 12 countries.

Midwinter's Day marks the halfway point for personnel working in Antarctica during the austral winter. Traditionally, Midwinter's Day greetings have been sent by the President of the United States to the international wintering community to boost morale at the stations and to demonstrate the continuing interest that the United States has in Antarctica. The first message was sent by Dwight D. Eisenhower in 1959. The text of President Reagan's message follows:

"Thirty years ago expeditions from diverse nations converged on Antarctica. This began the continuous occupation of the continent by men and women who probe the secrets of this unique natural laboratory. Here they observe and study the experiments that Nature has performed over millions of years. The results of their investigations have enabled them not only to describe the region but also to show that Antarctica is an integral part of the global environmental system.

"All of you now in Antarctica also are participants in another continuing experiment. You have accepted a challenge—to show the world that citizens of many nations can work together in peace. As more nations turn their attention southward, the example you set will guide them.

"On this Midwinter's Day 1985, I commend you for your efforts and dedication. I hope that this year will be especially productive and satisfying and that you will return to your homes enriched by this experience."

pounds that also endanger the ozone layer has been reported by a group from the Max Planck Institute for Aeronomy in Lindau, West Germany. Their instruments were lifted 15 miles above southern France by balloon in the fall of 1982, 1983 and 1984. Production of such compounds, including those used in fire extinguishers, appears to be increasing rapidly.

The original warning by Dr. Rowland and Dr. Molina concerned the chlorine that would be released when fluorocarbons are exposed to ultraviolet rays in the stratosphere. While those synthetic compounds are normally very stable, when exposed to ultraviolet light they break down and one of their constituents is chlorine, which can remove ozone from the atmosphere. The molecules of ozone gas are formed of three oxygen atoms, whereas oxygen gas contains only two of them. When chlorine reacts with an ozone molecule, breaking it up, the chlorine remains intact, ready to attack another one.

Photo by John Splettstoesser.

Eliason motor toboggans on the trail in Ellsworth Mountains.

Soviet Vessel Is Freed From Ice in Antarctic

MOSCOW, July 26 (AP) — A Soviet icebreaker sliced through the last stretch of a drifting Antarctic ice field surrounding the research vessel Mikhail Somov today, freeing the ship and its crew after 133 days.

A brief Tass press agency report announcing the rescue did not say how many crew members and researchers were still aboard when the icebreaker Vladivostok cleared a path to the ship. Previous reports said 53 Russians had remained with the vessel.

The Vladivostok was sent from the Soviet Far East on June 10, nearly three months after the Mikhail Somov was sealed into a huge ice floe in the Ross Sea area in a severe storm.

Viktor Gusev, a special Tass correspondent on the icebreaker, said, "We saw tired and hollow-cheeked but smiling and lively, faces of the people from the courageous vessel."

Those aboard the research ship will be transferred to a permanent ice station, Tass said. The one-paragraph report gave few details of the rescue.

The Mikhail Somov was trapped in mid-March while delivering supplies and personnel to the Russkaya research station in the Pacific sector of Antarctica. A heavy storm broke out during cargo handling on March 15, whipping winds to 112 miles per hour and making worse already dangerous ice conditions, Tass said at the time.

A Soviet Icebreaker Guides Ship Out of Antarctic Icefield

MOSCOW, Aug. 3 (Reuters) — The icebreaker Vladivostok conducted a Soviet research ship out of a thick Antarctic icefield today, freeing it after four months of captivity, a Tass correspondent aboard the Vladivostok reported.

The reporter said the icebreaker and the research ship, the Mikhail Somov, crossed the 71st parallel, which roughly marks the edge of Antarctica's permanent sea of ice, and were making slow progress through patchy ice toward open waters 620 miles to the north.

"Although the weather continues to be bad, it now determines not the very movement of the ships, but only their speed," Tass said.

Both ships are expected to reach New Zealand to refuel in late August and then make for Vladivostok, the Soviet Far East port the icebreaker sailed from in June on a mission to rescue the Mikhail Somov and its crew.

naturalists

The British Antarctic Territories will commemorate early naturalists on a set of stamps to be released Nov. 4.

key to seals' deep diving

Boston (AP) — Scientists working on the antarctic ice believe they have solved the puzzle of how deep-diving seals can plunge 1,500 feet to the ocean floor and then swim rapidly back to the surface without suffering the excruciating bends.

The seals' secret: They collapse their lungs and store potentially harmful nitrogen throughout their bodies.

The international team of scientists attached computerized pumps to Weddell seals, then drew blood samples as the mammals dived below the ice of McMurdo Sound. The half-ton seals can stay down for more than an hour as the fish for cod.

"People had reasoned how a sea manages to avoid the bends, and they got it pretty much right," said Dr. Roger D. Hill of Massachusetts General Hospital. But the latest research "is the first definitive evidence."

A report on the experiments, conducted with researchers from West Germany, Denmark, Australia, New Zealand and Canada, was published in the latest issue of the journal Science.

The bends, or decompression sickness, is a painful condition that results when human divers return too quickly from the depths. It can lead to stroke or even death.

When people go on long dives, they typically wear scuba tanks so they can breathe. The water pressure on their lungs increases as they go down, so the air pressure in their tanks automatically increases to keep their lungs from collapsing.

The increased pressure means their blood absorbs higher-than-usual amounts of oxygen and nitrogen, the primary components of air. The body burns the oxygen, but nitrogen levels build up in the blood.

As long as the diver stays down, this nitrogen will remain dissolved in the blood. But once he starts to come up, the pressure on his body decreases, and the nitrogen may start to form bubbles. These bubbles cause the bends.

To avoid this, a diver must stop periodically as he swims up so his lungs have time to remove the excess nitrogen from his blood.

The antarctic study found that the nitrogen level in a seal's blood reaches a peak when the animal gets about 100 feet or so below the surface. Then it actually drops a bit as the animal goes deeper.

The scientists found that the seals accomplish this through several biological tricks.

Instead of taking a big gulp of air, as a human diver would, the seal exhales as it ducks into the water.

While the animal dives, a little nitrogen is dissolved in its blood while the water pressure builds. This nitrogen has a calming effect.

"That allows him a little bit of anesthesia and not too much to give him rapture of the depths," a drunk feeling that results from too much of the gas, said Dr. Warren M. Zapol, a Massachusetts General anesthesiologist who was in charge of the project.

By the time the seal reaches a depth of 100 feet, all the air is squeezed out of the air sacs in its lungs. Since there's no more air in its lungs, there's no nitrogen to be dissolved into its blood stream.

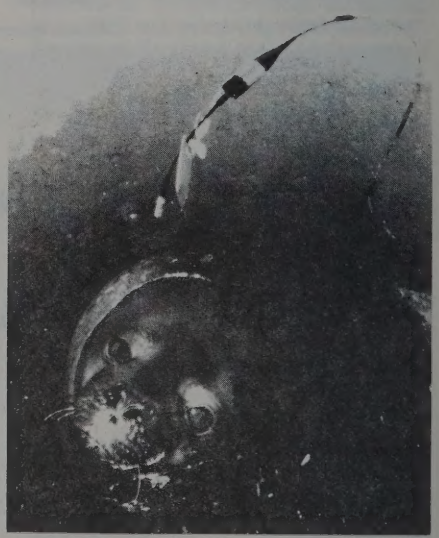
The air that is squashed out of the air sacs is stored in the seal's reinforced windpipe where it cannot be picked up by the blood. As it swims, some of the nitrogen already in its blood is redistributed into its blubber and muscles.

On its way back to the surface, the seal partially reinflates its lungs by allowing the gas in its windpipes to expand its air sacs.

"When he finally gets to the surface and breathes, he doesn't have very much nitrogen, so he doesn't get the bends," said Zapol.

This photograph shows a Weddell seal with the 8-bit microcomputer used by Dr. Zapol's research team to monitor changes in the seals body during deep dives.

NSF photo courtesy of Warren Zapol.



NSF photo courtesy of Warren Zapol.

A Weddell seal comes up for air at one of the isolated breathing holes drilled for this experiment. The electrocardiogram lead with the computer backpack in the background are visible in this photograph.

An Explorer at the Bottom of the World

Call it one of the word's most unusual vacations. Call it a trip—literally—to the ends of the Earth. Call it the ultimate adventure in Exploring. Call it the continuation of one of Scouting's oldest and proudest traditions.

For 20-year-old Doug Barnhart of Post 95 in Pittsburgh, Pa., it was all these things and much, much, more. In late 1984 Doug boarded a U.S. Coast Guard icebreaker for a 29,000-mile odyssey to Antarctica and the South Pole that lasted for nearly six months.

Before it was over, Doug had seen some of the more incredible sights on Earth, taken part in several important scientific research projects, and enjoyed the distinction of being the sole representative of Exploring and Scouting on an entire continent.

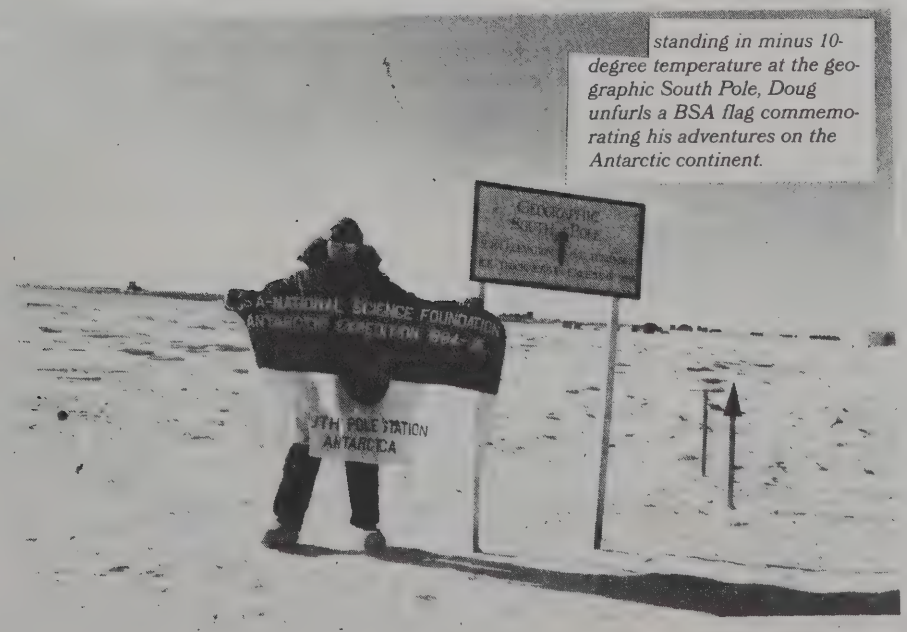
To win the right to become only the fourth Scout in BSA history to follow the steps of Admiral Richard E. Byrd to the "bottom of the world," Doug had to meet a set of rigorous qualifications and beat out 250 other applicants, all of them Eagle Scouts.

After his selection, Doug had six months to get ready for his departure from Los Angeles aboard the 400-foot USCGC *Polar Star*, this country's largest icebreaker.

Doug stands beside a statue of Antarctic explorer Adm. Richard Byrd.

Doug took his turn standing watch and working the same long shipboard days as regular members of the 140-member crew, as the *Polar Star* headed south. Although it was midwinter in the States, the brief Antarctic summer was at its peak when Doug arrived at McMurdo, the only "town" as such on the frozen continent, on Jan. 15, 1985.

Then, on Jan. 21, came the climactic moment that Doug had waited for and dreamed about so long. He and Dr. Eric Chiang of the National Science Foundation boarded a ski-equipped LC-130 cargo plane for the three-hour flight from McMurdo to the South Pole.



standing in minus 10-degree temperature at the geographic South Pole, Doug unfurls a BSA flag commemorating his adventures on the Antarctic continent.

After a landing that Doug found surprisingly smooth, he was welcomed to the domed Amundsen-Scott South Pole Station (named for Norwegian explorer Roald Amundsen, who discovered the South Pole in 1911, and Robert Falcon Scott, the British explorer who died trying to reach the pole in 1912) by Station Manager Ed Duplek.

"All the vital parts of the station are under the dome, including the power plant, infirmaries, mess hall, laboratories, and most of the living quarters," Doug explains. "These are all in separate buildings, which are covered by the dome to keep the snow from drifting over the station."

Following a three-week oceanographic cruise and a stopover in New Zealand on the trip back to the United States, Doug returned to his home in the Pittsburgh suburb of McMurry, Pa., to his premed studies at Johns Hopkins, and to a routine much like those of the rest of us.

FACTS ABOUT THE UNITED STATES ANTARCTIC RESEARCH PROGRAM

More than 1,000 Americans work in and around Antarctica each year in the United States Antarctic Research Program. This National program involves the operation of ships, aircraft, stations, and camps, and it draws upon the resources and scientists of numerous U.S. universities, a number of Federal agencies, and several commercial firms.

Physical description of Antarctica

An ice sheet covers nearly all of Antarctica. At its thickest point the ice sheet is 15,670 feet deep—almost 3 miles. It averages 7,000 to 8,000 feet thick, making Antarctica the highest continent. This ice is 90 percent of all the world's ice, and it is 70 percent of all the world's fresh water.

The Transantarctic Mountains cross the continent, dividing the ice sheet into two parts. The larger, eastern part rests on land that is mostly above sea level. It has been there at least 14 million years. The smaller, western part is on land that is mostly below sea level.

Other mountain ranges are the Prince Charles Mountains and smaller groups near the coasts. The Antarctic Peninsula has many mountains. The Ellsworth Mountains are Antarctica's tallest; the Vinson Massif is 16,066 feet above sea level.

About 2 percent of Antarctica is ice-free. These areas, generally near the coast, include the dry valleys of southern Victoria Land, the Bunger Oasis in Wilkes Land, and isolated spits of land.

Surrounding Antarctica are the southern parts of the Pacific, the Atlantic, and the Indian Oceans. The Antarctic Convergence, which encircles Antarctica roughly a thousand miles off the coast, divides the cold southern water masses and warmer northern waters. An ocean current, the world's largest, moves eastward around the continent at an average speed of about half a knot. Sea ice up to 10 feet thick forms outward from the continent every winter, making a belt 300 to 1,000 miles wide. Even in summer the sea ice belt is 100 to 500 miles wide in most places.

Some 200 million years ago Antarctica was joined to South America, Africa, India, and Australia in a single large continent called Gondwanaland. There was no ice sheet, and trees and large animals flourished. Today, only geological formations, coal beds, and fossils remain as clues to Antarctica's warm past.

Antarctica is the coldest continent. The world's record low temperature of -128.6°F was recorded there. The mean annual temperature of the interior is -70°F. The coast is warmer. Monthly means at McMurdo Station range from -18°F in August to 27°F in January. Along the Antarctic Peninsula, temperatures as high as 59°F have been recorded. Some coasts of Antarctica are the windiest places in the world. Winds on the Adelie Coast in the winter of 1912-1913 averaged 40 miles an hour 64 percent of the time, and gusts have been recorded at nearly 200 miles an hour.

The interior of Antarctica is one of the world's major deserts, with the precipitation (if it were melted) averaging 1 to 2 inches of water a year.

Currently active year-round U.S. stations

McMurdo (*77°51'S 166°40'E*). America's largest antarctic station, McMurdo is built on the bare volcanic rock of Hut Point Peninsula on Ross Island, the farthest south solid ground that is accessible by ship. It is the logistics hub of the United States Antarctic Research Program, with a harbor, landing strips on sea ice and shelf ice, and a helicopter pad. Its 130 buildings range in size from a small radio shack to large, three-story structures. Science laboratories, repair facilities, dormitories, administrative buildings, a firehouse, power plant, water distillation plant, wharf, stores, clubs, and warehouses are linked by above-ground water, sewer, telephone, and power lines. The station was established in December 1955.

Little America. There were five Little Americas, all on the Ross Ice Shelf adjacent to the Bay of Whales or Kainan Bay. Numbers I and II supported Richard E. Byrd's expeditions in 1928-1930 and 1933-1935. III was operated in 1939-1941 as part of the United States Antarctic Service and was also called West Base. IV was used by Operation Highjump, 1946-1947. V was an International Geophysical Year station, operating from 1955 to 1959. All these stations have gone to sea as a result of calving of the Ross Ice Shelf.

Research objectives

Scientific investigation of Antarctica began on the present scale with the 1957-1958 International Geophysical Year, and, since then, continuous research by many nations has come close to completing a reconnaissance of the continent and its surrounding oceans.The goal of the United States Antarctic Research Program is to foster research on worldwide and regional problems of current scientific importance and to expand fundamental knowledge of the region. Research projects in the United States Antarctic Research Program are performed by investigators from universities and, to a lesser extent, from federal agencies and other organizations, and are supported by the National Science Foundation. Investigators may perform research and analysis individually, in small teams, or in large interdisciplinary groups.

In meteorology, Antarctica is Earth's largest heat sink, with its ice sheet containing about 90 percent of the world's glacial ice. As such, it is believed to play an important role in the planet's weather and climate. Research objectives are to improve understanding of the physical processes characteristic of the atmosphere over Antarctica, to determine the relationship between the antarctic atmosphere and global circulation and to determine Antarctica's role in past and present global climate. Much of the research in meteorology and atmospheric chemistry is performed at South Pole Station, but some is done at the other stations and aboard the LC-130 airplane specially equipped for meteorology and air chemistry. Automatic weather stations are used to

collect data at several remote locations. At South Pole Station, a clean-air sampling facility enables studies of atmospheric aerosols and trace gases and monitoring of changes in climate and in background levels of world atmospheric constituents including pollutants.

Ocean Sciences. Because of large-scale heat losses at high latitudes, the southern ocean is a major source of cooler intermediate and deep water masses that circulate throughout the world oceans. Nutrient-rich waters support high biological activity. Large annual variations in temperature and the extent of sea ice profoundly influence energy transfer processes. The sea floor around Antarctica presents fundamental problems in marine geology and geophysics. A major objective is to support physical, geological, and geophysical studies and to investigate the relationship between oceanic and atmospheric circulation systems and the physical basis for the biological productivity of antarctic waters. A circumantarctic survey from 1962 to 1979, in which the ice strengthened ship Eltanin made 66 cruises covering 521,000 nautical miles, provided much basic information and a framework for the current continuing program of problem-oriented ship-based research.

Glaciology. The world's largest ice sheet covers 98 percent of the antarctic continent in thicknesses up to 4.8 kilometers. It is a vast storehouse of information about climate and atmospheric constituents and their variation over time. Research activities have been predominantly descriptive with emphasis on the extent of the ice sheet and its surface characteristics, such as temperature and snow accumulation. Some deformation measurements have been made. There is much to be learned through study of the internal characteristics of the ice sheet using, for example, radio-echo sounding, ice coring, and thermal probes. Ice cores have been drilled to bedrock and to shallower depths. Oxygen-isotope studies, use of radioactive isotopes for dating, analysis of fabrics, and chemical measurements can be pursued to extract paleoclimatic data. Surging glaciers are of keen interest to glaciologists. Although there are no known surging glaciers in Antarctica, a better understanding of the range of physical conditions that cause surging and how close or how far the antarctic ice streams are from these conditions may be crucial to understanding the past and present dynamics of the ice cover of Antarctica, especially the west antarctic ice sheet. The present west antarctic ice sheet may be as young as 125,000 years old, while the east antarctic ice sheet could well be 25 million years old.

Amundsen-Scott South Pole (90°S). Americans have occupied the geographic South Pole continuously since November 1956; the station was rebuilt in 1975 as a geodesic dome 50 meters wide and 16 meters high that, with 14- by 24-meter (46 by 80 foot) steel archways, covers modular buildings, fuel bladders, and equipment. Two detached buildings house instruments for monitoring the upper and lower atmosphere. There is an emergency camp. Some 17 scientists and support personnel winter at the station, and 50 or more people work there during the summer.

An ongoing *Antarctic Bibliography* prepared by the Library of Congress abstracts and indexes the world antarctic literature published between 1951 and the present.

International cooperation

A. *Antarctic Treaty.* The Antarctic Treaty, signed at Washington, D.C., in 1959 and entered into force in 1961, establishes a legal framework for the area south of 60oS, which includes all of Antarctica. There are two types of Antarctic Treaty parties. Consultative nations, are empowered to meet periodically and to influence operation of the treaty. Acceding nations agree to abide by the treaty, but, not being among the original signatories and not having substantial programs in Antarctica, do not participate in the consultative process. Appendix 1 contains the Antarctic Treaty and a list of participating nations.

The treaty provides that Antarctica shall be used for peaceful purposes only: it prohibits military operations except in support of peaceful activities. It provides that freedom of scientific investigation and cooperation shall continue coordination of scientific activity in Antarctica, with a view to framing a scientific program of circumpolar scope and significance." Membership consists of a representative from each country engaged in antarctic research, representatives of other ICSU organizations as appropriate, and the World Meteorological Organization. Other international organizations may designate observers to attend meetings of SCAR. For the United States, the national committee adhering to SCAR is the Polar Research Board of the National Academy of Sciences.

SCAR meets every 2 years in a SCAR country to consider various scientific and logistics objectives and accomplishments. It also sponsors or associates with major symposia on antarctic subjects. Sometimes SCAR establishes working groups to develop information or reports in response to Antarctic Treaty recommendations. An example is a 1979 report on possible environmental effects of mineral exploration and exploitation, developed in response to a recommendation made at the 1975 Antarctic Treaty consultative meeting.

Bilateral and multilateral cooperation. Within the context of the Antarctic Treaty, extensive international cooperation takes place in Antarctica to more effectively accomplish both science projects and logistics. Some examples are exchanges of personnel among stations, cooperative planning and execution of large-scale science projects such as deep rock core drilling and glaciological exploration, and the exchange or shared use of logistics assets such as ships and aircraft. The United States has pursued cooperative projects with every Antarctic Treaty nation.

The United States Antarctic Research Program is the nation's program for research and presence in Antarctica. It is funded and managed by the federal government, with agency responsibilities as follows.

A. *Antarctic Policy Group* serves as the policy guidance body for the totality of U.S. activities under the Antarctic Treaty (described below). Its membership consists of the Secretary of State (chairman), the Director of the National Science Foundation, the Secretary of Defense, or their designees, and representatives of other agencies as appropriate.

B. *National Science Foundation* has overall funding and management responsiblity for the U.S. activities in Antarctica.

Past U.S. antarctic expeditions

A. *Before International Geophysical Year*

United States expeditions to Antarctica have occurred almost since the beginning of the nation. Among the notable ones, in 1820 Nathaniel Palmer, a Connecticut sealer, saw the Antarctic Peninsula from his 14-meter sloop *Hero*. John Davis made the first known landing on Antarctica, at Hughes Bay, in 1821. James Eights, a scientist, provided remarkably advanced natural history reports after accompanying sealers to the South Shetlands in 1829-1831. Charles Wilkes headed a Navy expedition that in 1839-1840 explored and mapped the coast of Wilkes Land and established that Antarctica is a continent. Carl B. Eielson piloted the first airplane flown in Antarctica, in 1928. Richard E. Byrd introduced largescale mechanization of antarctic exploration in two expeditions, in 1928-1930 and 1933-1935, that included extensive exploration by airplane and the first flight over the South Pole. Lincoln Ellsworth flew across Antarctica in 1935 and discovered the American Highland in 1938-1939. The government established two antarctic stations in 1939-1941 that were intended to begin a continuing antarctic service (World War II ended this plan). In 1946-1947 the Navy's Operation Highjump, the largest expedition ever made to Antarctica, used 13 ships, several helicopters and airplanes, and 4,700 men; it performed extensive aerial photography for mapping. A smaller Navy expedition, Operation Windmill, followed in 1947-1948. Finn Ronne's expedition in 1948 established a wintering station and explored and mapped at the base of the Antarctic Peninsula.

B. *International Geophysical Year, 1957-1958*

The International Geophysical Year, 1 July 1957 to 31 December 1958, was a great cooperative endeavor by the world's scientists to improve their understanding of the earth and its environment. Much of the field activity took place in Antarctica, where 12 nations established some 60 research stations.

The United States established six research stations—Little America, Hallett, South Pole, and Byrd (described in section III), plus Wilkes (on the coast of Wilkes Land, East Antarctica) and Ellsworth (on the Filchner Ice Shelf). Naval Air Facility, McMurdo Sound (now McMurdo Station), was set up as a logistics base from which to supply South Pole. Studies were directed toward geophysics and upper atmosphere physics and included simultaneous observations at all parts of the globe. In addition, long scientific traverses were made to collect data in glaciology, seismology, gravimetry, and meteorology. Geological and biological samples were collected, although these disciplines were not formally part of the IGY.

At the close of the IGY, it was recognized that many scientific problems merited continued attention, and most of the IGY antarctic nations decided to continue their research. The United States established its United States Antarctic Research Program, which has operated continuously to this day.

During survival training two participants walk through a crevassed area on Ross Island.

NSF photo by Ann Hawthorne.

NSF photo by Russ Kinne.

Research assistants Scott O'Grady and Wayne Van Voorhies stand on an ice outcrop at the Dailey Islands. They are preparing to set out stakes to measure ice ablation as part of a University of Illinois biology project.

The Age of Discovery

Men's minds were haunted by the idea of a great southern continent for many centuries before Antarctica was discovered. The Polynesians, including the Maoris of New Zealand, had legends about a white land to the south of them—their big canoes apparently had sailed south until stopped by ice. Earlier, the ancient Greeks believed that a great southern continent must exist. It was needed, they thought, to balance the land masses of the Northern Hemisphere. Although none of them ever saw it, they gave the region its name: in Greek, Antarctic means "the opposite of the Arctic."

Preludes to Discovery

Many famous voyages were made to find the fabled southern continent, for men imagined it to be populated and to contain great riches. The earlier of these explorers instead discovered Australia and many South Pacific islands. It is possible that a number of ships blown off course by the great storms around Cape Horn may have glimpsed some of the antarctic islands, but the first documented discovery of land within the Antarctic Convergence was not made until the 18th century: on January 1, 1739, a French expedition under Bouvet de Lozier sighted a snow-covered, fog-shrouded island in the South Atlantic, now called Bouvet Island. On February 12, 1772, another Frenchman, Yves de Kerguelen-Tremarec, discovered the Kerguelen Islands in the southern Indian Ocean. In between came another discovery. A passenger on a Spanish merchant ship reported sailing around a large island east of Cape Horn in 1756. It was given the name of San Pedro, but it now appears on the map as South Georgia.

Both Bouvet and Kerguelen thought that their discoveries might be part of the great southern continent. Kerguelen was later to revisit the area and determine for himself that he had actually seen islands. Before he did, however, Captain James Cook of the British Navy, one of the most illustrious navigators of all time, brought to an end the dream of an inhabited southern continent. Between 1772 and 1775, he sailed completely around Antarctica. Although he never sighted it, he did penetrate farther south than any man before him, and on January 17, 1773, he became the first man to cross the Antarctic Circle. He encountered great expanses of pack ice and many huge icebergs. This, and the presence of numerous seabirds, led him to believe that an ice-defended land lay to the south.

Even if Cook did not see Antarctica, he did sight the South Sandwich Islands and rediscovered South Georgia. On the beaches of the latter he spied fur seals. This news was of great interest to hundreds of adventurous American and British seal hunters. The demand for sealskins was very great in those days, and as the number of seals on known beaches decreased, the hunters sailed further southward looking for new beaches and more seals. Cook's report was like a magnet drawing them onward.

Discovery of a Continent

It seems probable that these sealers were the first people to see Antarctica. The sealers, however, frequently tried to keep their discoveries secret to prevent others from knowing of new seal colonies. Also, they did not keep very good records—and many of those they did keep have been lost.

We are fairly certain, however, that on November 17, 1820, Captain Nathaniel B. Palmer, of Stonington, Connecticut, sighted the continent near the tip of the Antarctic Peninsula. The first known landing on the continent was made a few months later. On February 7, 1821, Captain John Davis, of New Haven, Connecticut, sent a boatload of men to look for seals on the shore of what is now called Hughes Bay. Captain Davis' logbook was found only a few years ago.

After Wilkes, d'Urville, and Ross returned to their homelands, men lost interest in antarctic exploration. For 50 years, only occasional efforts were made to learn more about the mysterious white continent, although sealers and whalers from the United States based their operations on islands within the Antarctic Convergence until about 1880.

The Heroic Era

Shortly after 1890, interest in the Antarctic revived, to continue ever since. There seem to be two principal reasons for this: first, scientists were convinced that more must be known about the south polar region if we are to understand the world and the universe better; second, new methods of whaling made it possible to catch and use antarctic whales.

During the winter of 1898, a Belgian exploring expedition under Lieutenant Adrien de Gerlache found its ship frozen fast. All winter long, the *Belgica* drifted with the ice until another summer freed her. Just about the time the ice loosened its grip on the Belgian ship, a British expedition, led by C. E. Borchgrevink, landed at Cape Adare. This landmark is at the western entrance of the Ross Sea. Here, Borchgrevink and his party built a hut. Their ship sailed away to New Zealand and returned to pick them up the following summer.

These two expeditions began what has been called the heroic era of antarctic exploration. Before de Gerlache, no scientific party had spent a winter in the Antarctic. Before Borchgrevink, none had attempted to live on the continent. Previously, men had been limited to what they could see during the summer—and then they had gone ashore only very briefly, if at all. Now it was proved that a base could be set up during the summer and journeys into the interior begun early the following spring. This has remained a principal procedure of antarctic exploration.

During the heroic period, men penetrated the continent and reached the South Pole itself. They faced dangers about which they knew little, with equipment that was frequently inadequate to the task. How to survive was learned by surviving. Above all, these early explorers had courage. From their failures and their successes were learned the techniques of antarctic exploration.

In 1901, German, Swedish, and British expeditions took to the field. All had their exciting times. The Germans' ship, *Gauss*, was frozen in the ice within sight of their goal and drifted with the pack for a year. The Swedes, on the other hand, made shore, but their relief ship, *Antarctic*, was crushed, leaving both the wintering-over party and the ship's company to make out as best they could. Their experiences proved that men could live from what they could find in the Antarctic.

Australian Antarctic Territory will release the second set of stamps in its Antarctic Scenes definitive series Aug. 7.

The designs reproduce photographs taken by expedition ers.

Garry Emery of Melbourne prepared the designs which show Prince Charles Mountains (15¢); Iceberg Alley (33¢); brash ice (45¢); pancake ice (90¢); and emperor penguins ($1).

A tumble of collapsed ice on the edge of a glacier appears on the 15¢ stamp. The photograph was taken in the Prince Charles Mountains which lie about 100 miles from the ANARE Mawson Station.

Iceberg Alley (33¢) is the name given to a channel used by supply ships approaching Mawson Station. Towering icebergs grounded on either side of the channel account for the name.

The 45¢ shows floating fragments of splintered sea ice and disintegrating icebergs. In this form, it is known as brash ice.

At the onset of winter, fine ice crystals form in the Antarctic seas and float to the surface. The soupy layer coagulates into pancake ice like that shown on the 90¢ stamp.

Eventually the pieces of pancake ice freeze together to form a solid cover of sea ice.

The only birds to breed on the Antarctic continent in winter are the emperor penguins. The Auster rookery, near Mawson Station, is pictured on the $1 value. Emperor penguins are the largest of penguin species.

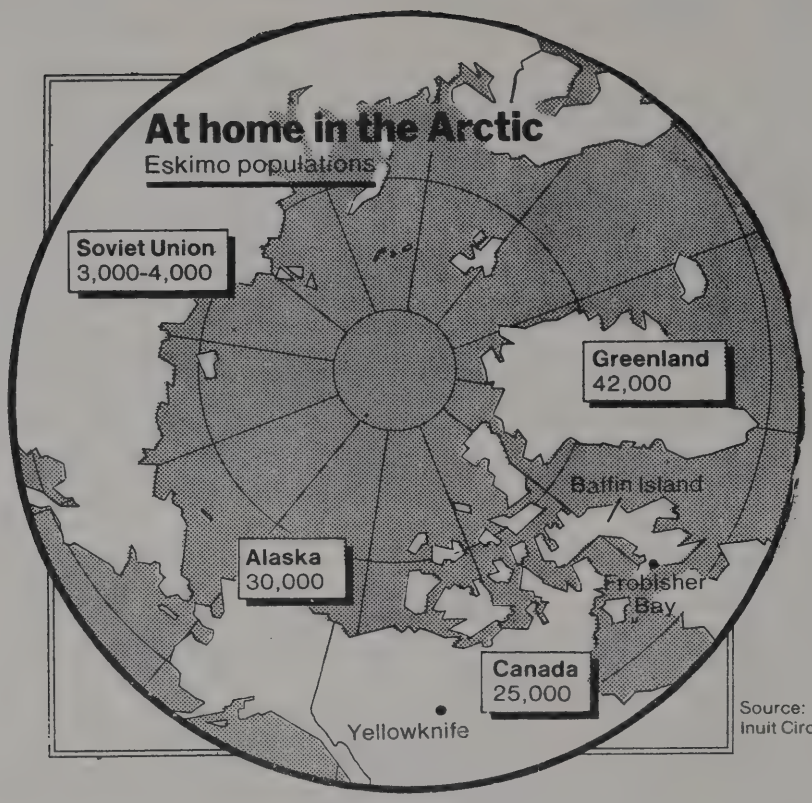
Antarctic Treaty issue

It is perfectly natural for the Chileans who have for many years administered a slice of the Antarctic cake, to remind us of the 25th anniversary of the Antarctic Treaty which becomes dues for renewal in five years.

The Antarctic subcontinent is extremely rich in natural resources, oil and coal, fish, krill, and other basics are to be found in abundance.

Hence the interest in what would otherwise be one of the least hospitable spots on earth.

To this day the Antarctic is inhabited only by selected groups of hardy scientists,



The New York Times/Christopher S. Wren

The Anglican cathedral, built of wood to resemble an igloo, in Frobisher Bay, Northwest Territories, 200 miles south of the Arctic Circle. Inset, a fiberglass prefabricated school in the community.

THE POLAR TIMES

Scientists can now use sophisticated tracking devices to follow the movements of caribou on Alaska's North Slope to learn more about their migration patterns. Satellite tracking is also useful for monitoring polar bears and musk oxen in Alaska.

(U.S. Fish and Wildlife Service photo)

Opening mystifies scientists

Ozone levels drop above South Pole

WASHINGTON (AP) — Scientists are trekking to the icy wastes of Antarctica, where they will use high-altitude balloons to study a mysterious and alarming ozone "hole" in the atmosphere above the South Pole.

Because of the importance of the atmospheric studies, 13 scientists will be on one of the first flights in August to the winter-locked U.S. base at McMurdo Sound, the National Science Foundation announced Sunday.

Six ski-equipped transport planes will make the 2,100-mile trip from New Zealand, a hazardous night journey normally restricted to personnel essential for the seasonal opening of McMurdo and a few scientists manning crucial experiments.

The sun stays below the horizon for much of the Antarctic winter, which, south of the Equator, occurs in what is summer in northern climes.

Four groups of researchers will use 33 high-altitude balloons and sophisticated instruments in hopes of finding out what causes the recently discovered phenomenon of a drastic drop in the total amount of ozone each spring over the South Pole.

This hole — about the size of the continental United States — occurs in a layer of the stratosphere above the South Pole that protects the Earth from harmful solar radiation.

A form of oxygen that exists in small amounts throughout the atmosphere, ozone also is concentrated 15 miles above the Earth in the stratosphere.

Ozone is critical because it screens out almost all of the sun's harmful ultraviolet radiation. Scientists say a drop in ozone would increase the incidence of skin cancer, possibly harm plant life and cause a number of other adverse effects.

Concern about the ozone layer surfaced a decade ago when some scientists suggested it was being depleted by wide use of certain fertilizers and chlorofluorocarbon chemicals used as refrigerants in cooling systems and propellants in aerosol sprays. The concerns led to restrictions on use of some of these chemicals.

Scientists say the Antarctic episodes do not appear to be an immediate threat to worldwide ozone levels because no completely empty hole has appeared, only a relatively small proportion of the ozone layer is affected and because each incident lasts only a month.

The Polar Times

Published June and December by the AMERICAN POLAR SOCIETY, August Howard, Secretary, 98-20 62nd Drive (Apt. 7H), Rego Park, New York 11374

AUGUST HOWARD, Editor

THE POLAR TIMES highly recommends "The Polar Record," published by the Scott Polar Research Institute, Cambridge, England.

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are $2.00 a year or $5.00 for 3 years, which entitles members to receive THE POLAR TIMES twice a year.

The American Polar Society is classified as a tax exempt organization under Code Section 509 (a) (2).

Telltale Meteorites

Since 1969 Antarctica has been recognized as the richest hunting ground for meteorites in the world. A new study shows that meteorites found in Antarctica are not only more numerous than those found elsewhere; they are also chemically different.

Japanese glaciologists discovered 16 years ago that the West Antarctic Ice Sheet is a natural collecting mechanism for meteorites. A fallen meteorite typically sinks deep into the ice sheet, where it may remain buried for hundreds of thousands of years. But Antarctic meteorites often become caught in the slow currents of ice "rivers" which, when diverted to the surface by outcrops of rock, bring their cargo of meteorites with them. Once brought to the surface of the ice, the meteorites are easy to spot; more have been collected in Antarctica since 1969 than everwhere else in the world combined.

Dr. Jane E. Dennison and colleagues at Purdue University report in Science that stony meteorites from Antarctica contain significantly differeht trace elements than those found elsewhere. The Antarctic meteorites also tend to be far older: erosion destroys most meteorites lying on the ground within 200 years, while the meteorites brought to the surface in Antarctica, having been preserved in ice, are typically 300,000 years old.

But why should age make such a difference in the composition of a meteorite? The Purdue group concludes that the differences between modern-day meteorites and meteorites that fell 300,000 years ago must reflect extraterrestrial differences. Ancient meteorites may be debris from an entirely different type of extraterrestrial object than the kind that produced today's meteorites, the scientists surmise.

Solo Hiker Arrives At the North Pole

PARIS, May 12 (Reuters) — A French doctor has completed a solitary 63-day, 500-mile walk to the North Pole.

An organizer for the expedition, Michel Franco, said in a telephone interview from the expedition's base in Resolute Bay, Northwest Territories, that Jean-Louis Etienne, 39 years old, had radioed to the base that he was in good physical condition and great spirits. He said Mr. Etienne said he had reached the pole at 10 P.M. Saturday. He set off on March 7 from Ward Hunt Island, the northernmost point in Canada.

Mr. Franco said satellites had confirmed that Mr. Etienne had reached the pole by detecting flares he lit.

He said Mr. Etienne had to walk 20 hours nonstop.

American Polar Society

DR. NED OSTENSO
President

DR. RICHARD L. CHAPPELL
DR. JOHN H. ROSCOE
WALTER SULLIVAN
Vice Presidents

AUGUST HOWARD
Secretary

DR. WILLIAM O. FIELD
Treasurer

Board of Governors

ROBERT B. ATWOOD
WILLIAM B. BEATTY
PROF. WILLIAM S. BENNINGHOFF
MALCOMB W. BROWNE
JOSEPH A. BRUNTON, JR.
DR. RICHARD L. CAMERON
DR. JOSEPH M. CHAMBERLAIN
DR. ALBERT R. CRARY
WALTER H. DODD
GORDON FOUNTAIN
HERMAN R. FRIIS
EDWARD E. GOODALE
DR. LAURENCE M. GOULD
ARNOLD M. HANSON
DR. WILLIAM R. HUNT
DR. WALDO K. LYON
CAPT. DAVID C. NUTT
CHARLES E. PASSEL
DR. MARTIN A. POMERANTZ
MICHELE E. RANEY, M.D.
MRS. EDITH RONNE
DR. THEODORE SHABAD
DR. ALAN H. SHAPLEY
MRS. PAUL A. SIPLE
CHARLES H. STOLL

The Polar Times

No. 102 JUNE 1986

South Pole Expedition Loses Ship to Pack Ice

A GROUP of amateur British explorers, rescued by United States helicopters after their ship was crushed by pack ice, gathered at McMurdo Station yesterday for evacuation from Antarctica.

Three members of the party, Robert Swan, Roger Mear and Gareth Wood, succeeded Saturday in completing an 833-mile trek from Ross Island to the South Pole, covering essentially the same route traversed in 1911-1912 by Capt. Robert Falcon Scott of the British Navy and four companions. Captain Scott and his men, who were beaten to the Pole by a Norwegian expedition led by Roald Amundsen, died on the way back.

Although the latest British assault on the Pole was successful, the yacht supporting the expedition was not so lucky. Aboard the 139-foot Southern Quest, 18 men and three women narrowly escaped death Saturday when unusually heavy pack ice crushed and sank the vessel in deep water near Ross Island's Cape Evans. Lloyd's Registry of Ships describes the Southern Quest as a trawler converted into a pleasure yacht. It was built in 1958 and was strengthened two years ago for use in icy waters.

The expedition plan called only for a one-way overland trip to the South Pole, where the United States maintains a large year-around research station. (It is currently midsummer in Antarctica.) A Cessna 185 light plane carried by the Southern Quest was to take off from the sea ice, fly to the Pole and pick up Mr. Swan, Mr. Mear and Mr. Wood. Instead, however, the heaving pack ice stove in the sides of the 322-ton vessel; the ship then sank, and its 21 occupants escaped to a nearby ice floe.

Guy Guthridge, spokesman of the polar programs division of the United States National Science Foundation, said two HH52 helicopters operating from the Coast Guard icebreaker Polar Star were used to evacuate the 21 people stranded on the ice floe. The helicopters brought them to Beaufort Island, from which United States Navy UH1N helicopters ferried them the rest of the way to McMurdo Station, the main American base in Antarctica.

The Polar Star happened to be available for the rescue at the time because it was in the process of cutting a channel through the ice covering McMurdo Sound, which separates Ross Island from the Antarctic mainland. The channel is needed to enable a supply ship to make its annual trip to McMurdo Station, carrying fuel, heavy equipment and other supplies. McMurdo Sound, the southernmost body of water in the world, is covered by ice up to 12 feet thick for all but about two months a year.

Mr. Guthridge said that although the McMurdo channel normally takes only aboat one day to cut, an entire week was required this year because of the exceptionally heavy ice.

The three Britons who trekked to the Pole were to be flown to McMurdo Station aboard one of the Navy's four-engine C-130 ski planes that serve South Pole Station every day during the austral summer. "We're getting all 24 of them out of Antarctica as expeditiously as possible," an American spokesman said. "They're scheduled to arrive in New Zealand on Wednesday."

While the United States claims no territory in Antarctica, American facilities are the largest and best equipped on the continent, and local American officials exercise a certain degree of informal administrative control. Since Antarctic rescue responsibilities often fall to American officials, they try to discourage ill-prepared expeditions of any nationality.

National Science Foundation officials could offer no immediate explanation for the heavy ice this year, although both low temperatures and unusual wave and wind conditions probably played a role.

MALCOLM W. BROWNE

The New York Times / Jan. 14, 1986

Roald Amundsen takes a sighting at the South Pole.

Amundsen Photos Turn Up

News of Norway

Long-forgotten photographs recording Norwegian explorer Roald Amundsen's Antarctic expedition have emerged from an Oslo attic, nearly 60 years after his death. Historians say the 240 hand-colored glass slides, found in a malted milk crate, are a "national treasure of immense importance." Amundsen captured the world's imagination and won international acclaim when he reached the South Pole on December 14, 1911, beating Capt. Robert Scott, leader of an ill-fated British expedition that perished on the return trip, by only a month. Most of the rediscovered photos were taken by Amundsen himself.

Antarctic explorer in SA

Robert Swan, the young Briton who arrived at the South Pole two months ago after a 1 400 km walk across Antarctica, laid a wreath of proteas on March 26 at the monument on Cape Town's Foreshore to the man whose footsteps he followed — Captain Robert Falcon Scott.

He did so at a ceremony arranged by the Society of Master Mariners of South Africa to mark the death in Antarctica of Scott and his companions in March 1912 — and also to give thanks for the safe return of Swan and the other two members of his 1985/6 polar party, Roger Mear and Gareth Wood.

Captain Scott called at Simonstown in his ship *Terra Nova* in 1910 and was warmly received there — as were Robert Swan and his expedition when in Cape Town in December 1984.

8 U.S. Tourists Killed as Plane Crashes on an Island in Antarctic

By GEORGE JAMES

They were eight Americans, all men, united in a trip that would take them on the adventure of a lifetime — spending New Year's Day at a Chilean Air Force base in the fog-shrouded wastes of Antarctica.

But on New Year's Eve the adventure ended in tragedy for the men, one of whom was identified as Paul R. Cox, a Brooklyn teacher.

The twin-engine Cessna Titan 404 taking them from Punta Arenas, Chile's southernmost city, 1,000 miles to the Lieutenant Marsh Air Base in the South Shetland Islands crashed on an island near the base, killing them and two Chilean crew members, the authorities said yesterday.

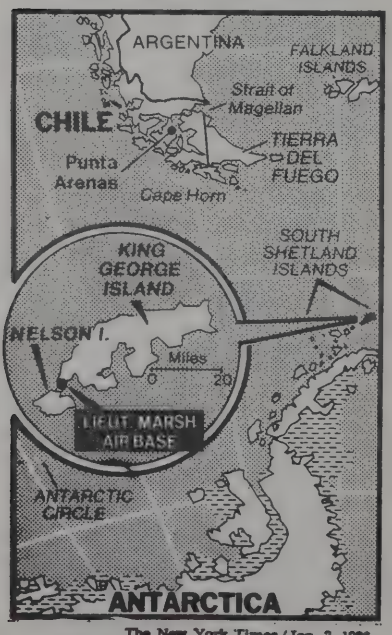
"Whether they knew each other before or just happened to end up in the same plane, we don't know," Wendell Belew, the duty officer at the United States Embassy in Santiago, Chile, said in a telephone interview.

To Confirm Identities

Last night a consular officer, Larry Huffman, from the embassy in Santiago, about 1,250 miles north of Punta Arenas, was scheduled to arrive at the base on King George Island to confirm the identity of the victims. He was then to set into motion the process that would begin State Department notification of next of kin in five states.

The cause of the crash, at the northern tip of the Antarctic Peninsula, was not immediately known.

Felipe Molina, a spokesman for Aeropetrel, a charter company that has operated Antarctic tourist flights for six years, said the plane overflew the fog-shrouded runway at the air base and crashed on Nelson Island, about six miles away. The base offers overnight accommodation to tourists.



The New York Times/Jan. 2, 1986

Plane crashed near air base.

The accident reportedly occurred at 8 P.M. Tuesday during the region's summer, when there is almost round-the-clock daylight.

Initial reports indicated that the plane climbed to give the tourists a panoramic view of the area before landing, and then lost altitude and crashed.

According to later reports, however, the pilot made an approach to the landing strip but could not land because of fog. Mr. Molina said the pilot informed the base by radio that he was going to make another approach. Then radio contact was lost and the plane disappeared.

48-Hour Excursion

The eight tourists had apparently taken advantage of a twice-monthly charter trip from Punta Arenas that costs about $7,000 per group. The 48-hour excursion includes lodging at the base and visits to breeding areas of penguins and sea lions.

The names of the eight tourists were disclosed by the charter company. Hanns Ebensten of Hanns Ebensten Travel Inc. of Key West, Fla., which arranged the tour, also provided to The Associated Press a list of the tourists and their hometowns. Occupations were obtained from registration cards at the Cape Horn Hotel in Punta Arenas, where the men stayed before the flight.

The victims were identified as: Ben Callis, 33, Key West, Fla.; Paul R. Cox, 59, teacher, Brooklyn; James C. Howell, 43, teacher, Yellow Springs, Ohio; James M. Jasper, 56, librarian, Oxnard, Calif.; Irving Lambrecht, 63, retired, Los Angeles; Tim Lang, 33, petroleum manager, Carmichael, Calif.; Walther P. Michael, 72, teacher, Columbus, Ohio, and Wayne Riddle, 61, engineer, Buchanan, Mich.

Colleagues of the two men from Ohio, quoted by the A.P., said Mr. Michael was an economics professor at Ohio State University and Mr. Howell was a biology professor at Antioch College.

None of the eight had ever been to Antarctica before, Mr. Ebensten said. "They were all looking forward to this tremendously," he said.

Last night, a call to the only Paul R. Cox listed in Brooklyn, at 184 Columbia Heights, reached an answering machine.

Neighbors in the small co-op building said Mr. Cox, a professor at Brooklyn College, was mainly interested in drama, French and French literature, and they found it hard to believe that he would be interested in traveling to Antarctica.

"As far as I know, he was on his way to Paris," said a neighbor, Margaret C. Appenzellar.

Also killed were the pilot of the 10-seat plane, Ivan Martínez Díaz, who was also the company's general manager, and his co-pilot, Armando Soto. Mr. Díaz was described as an experienced pilot.

Weather Delays Flight

The men had arrived from Argentina on Saturday, according to employees at the Cape Horn Hotel. They were to have flown to Antarctica on Monday, but their flight was delayed by bad weather.

About 300 tourists have visited the Lieutenant Marsh Air Base in recent years, according to a spokesman for the Chilean Government. The base has 30 permanent residents and can provide accommodations for 40 visitors. It has been the site for scientific and diplomatic meetings.

Chile is the first country to offer overnight tourist accommodations in Antarctica, which has become a growing attraction for cruise ships and charter flights.

In 1979, an Air New Zealand charter DC-10 crashed on Ross Island, killing all 257 Antarctic sightseers aboard in the continent's worst disaster.

Last night a Santiago funeral home reported that it had sent eight coffins to Punta Arenas at the United States Embassy's request.

Bounty of Antarctic Fish Appears Overestimated

Antarctic krill, the shrimplike crustaceans once touted as a virtually inexhaustible source of food for the world, may never fulfill their promise, according to marine biologists from the University of California at Santa Barbara.

Krill, they found, are not nearly as plentiful in the wild as once thought and the current comparatively low volume of krill fishing may be depleting the population.

Just a few years ago experts forecast that krill could supply up to 150 million tons of high-quality protein per year, more than double the total amount of seafood harvested worldwide. Now, it looks as if the current krill harvest, a modest 1 million tons a year (mainly by Warsaw Pact countries and Japan) may not be sustainable. The Soviet catch has fallen to one-quarter of what it was three years ago.

New studies of the life of the two- to three-inch-long animals shows that their huge schools are not distributed uniformly and that their reproduction is about half as prolific as once thought. Also, the main fishing season, the Antarctic summer, is also the breeding season. This means krill trawlers have an unusually severe impact on the species' reproductive potential.

Walter R. Seelig, New Zealand National Science Foundation representative, extends best wishes to internationally known Dr. Martin Pomerantz, University of Delaware, who studies solar oscillations each year at the South Pole.

30 Australian Scientists Rescued in Antarctica

HOBART, Australia, March 17 (AP) — An Australian ship has rescued 30 Australian scientists stranded in Antarctica, reaching them just ahead of advancing winter ice, Science Minister Barry Jones said today.

Scientists from Australia's Mawson station were rescued during the weekend, joining 22 others from Edgeworth David base who were rescued March 7.

Mr. Jones said the Australian supply ship Nella Dan at times had to seek shelter behind icebergs during fierce gales and to thread her way through treacherous ice floes to reach the scientists and researchers.

"It was operating close to the edge of the ice window when the freezing of the sea could have prevented ship access," he said. "It was a touch-and-go operation."

The rescued scientists were among 91 researchers who were to leave Antarctica late last year during the Southern Hemisphere summer. Plans went awry when the Nella Dan, a Danish ship on charter to Australia, became trapped in sea ice for five weeks.

The icebreaker Icebird finally freed the Nella Dan from frozen seas, but both vessels had to return to Hobart for repairs before starting another rescue effort. Hobart is the capital and chief port of Tasmania, Australia's southernmost state.

Some expedition members have been in Antarctica since January 1985.

Temperatures in Antarctica are now around 50 degrees below zero.

Mark Wolff, a spokesman for the Government's Science Department, said none of the scientists were in life-threatening situations.

"The worst that could happen is that some of them will have to remain in Antarctica until October," he said in an interview. "All the bases have at least a year's supply of emergency food."

Mr. Wolff said Australia did not ask New Zealand or the United States for help because it did not want to divert them from their scientific research work in Antarctica.

He said an airborne rescue had been ruled out because no Australian station in the Antarctic had a landing strip.

Mr. Wolff said the Nella Dan was now in open water about 350 miles north of Mawson Station, traveling at a speed of 11 knots, and was due to reach Albany, in western Australia, on March 26.

Mr. Wolff said the Icebird was on her way to Casey and Macquarie Island stations to pick up the remaining expedition members. He said the ship had about one week's leeway before sea ice would make it impossible to continue.

The scientists were doing research on the upper atmosphere and cosmic ray physics, land-based and marine biology, glaciology and weather observations, he said.

Scientists find ancient fossils in Antarctica

WASHINGTON (AP) — Scientists probing the cold rocks of a mountain range in Antarctica have found 225-million-year-old fossils of reptiles and amphibians, which they say may broaden the range of time researchers believe the animals lived on the now-frozen continent.

A team of scientists working along the transantarctic mountain range during the recently ended antarctic summer found more than 350 vertebrate fossils, including bones belonging to four new species of amphibians and reptiles, the National Science Foundation announced Sunday.

The foundation, which sponsored the expedition headed by Dr. William Hammer of Augustana College, Rock Island, Ill., said the cache included a triangular 2-foot-long skull and a jaw with inch-long teeth from two amphibians, animals at home on both land and in water.

"We shipped back 45 crates of material weighing several thousands of pounds," Hammer said in a telephone interview. "Most of the fossils are still in their surrounding material, and we have to get them out for detailed study and dating."

The discovery is significant because about 50 of the fossils were found at a Triassic period rock level that is 1,000 feet higher than levels where bones associated with that geologic period had been found previously, he said.

This "Antarctic taxi" is comparable to a wild horse and gives a somewhat rougher ride across the ice and snow.

Each year between early October and mid-November, the Air Force flies approximately 17 C-141 resupply flights from Christchurch to McMurdo Sound, which acts as a staging area for cargo and passengers headed to inland research projects.

Polar Explorers to debut in Alaska

A block of four 22¢ stamps which commemorate five intrepid polar explorers will be issued by the U.S. Postal Service May 28 in North Pole, Alaska. (North Pole is a station of the Fairbanks post office.)

The first day ceremony will take place at 1 p.m. at North Pole High School. Members of the Alaska Congressional delegation and state officials are expected to participate.

Details of the designs of the four stamps will not be released by the USPS until the block is unveiled May 21 at a meeting of the New York Explorers Society in New York City.

This is the reason no illustration of the designs accompanies this story. *Linn's* will picture them as soon as they are released by the Postal Service.

The four stamps honor the following:

— Elisha Kent Kane, who threw open the door to the North Pole by sailing his tiny ship *Advance* northward hoping for a sighting of the Polar Sea.

Kane was born Feb. 3, 1820, in Philadelphia, Pa. He was educated as a physician and became a U.S. Navy surgeon in 1843.

In 1850, he led an unsuccessful expedition to Greenland to search for the British explorer Sir John Franklin, who had been missing since 1845.

In 1853, Kane again made plans for an expedition to find Franklin and to establish whether or not there was an open sea around the North Pole.

Pushing into what is now known as Kane Basin and the Kennedy Channel as far as Cape Constitution, he thought he sighted the open Polar Sea.

Although his ship became icebound and none of Franklin's crew was found, Kane and his party accomplished much geographical and scientific work.

Ravaged by scurvy and often near starvation, the group took 83 days to reach safety in August 1855.

Kane died two years later.

— Adolphus Washington Greely, who endured devastating hardship to reach a point that was the closest any explorer got to the North Pole for 21 years.

LINN'S STAMP NEWS MAY 19, 1986

Greely was born at Newburyport, Mass., in 1844. He became an Army officer and was assigned to the Signal Corps in 1867. During his career, he introduced radio telegraphy to the corps.

In 1882, he led an expedition that explored Ellesmere Island and established a new northernmost record on Lockwood Island.

Greely's group collected valuable meteorological, tidal and magnetic data, faithfully carrying out their work as outlined by the International Circumpolar Conference.

But because scheduled relief ships never arrived, the party of 26 suffered two tragic years of lengthy marches, devastating blizzards and only six to ten ounces of rations per man before Greely and six other survivors were rescued.

In 1887, Greely became chief signal officer in the Signal Corps. He also supervised the building of telegraph lines in the Southwest.

Greely died in 1935.

— Robert E. Peary and his resourceful assistant, Matthew Henson, whose expeditionary assaults ended in triumph at the North Pole in 1909.

Peary, who also was commemorated on an Arctic Explorations stamp issued in 1958, was born May 6, 1856, in Cresson, Pa. He graduated from Bowdoin College.

From 1879-81, Peary served as a draftsman for the U.S. Coast Guard and Geodetic Survey in Washington, D.C. He then became a civil engineer in the U.S. Navy.

His significant discoveries and mapping accomplishments done in explorations over a 23-year period often were overshadowed by the struggle between him and his beloved adversary, the Arctic.

Peary endured numerous setbacks and the loss of eight toes to prove that man can conquer the planet he inhabits.

With his goal at hand, Peary led five forced marches totaling 133 miles to reach the North Pole on April 6, 1909 — and then covered 485 miles in 16 days to get off the opening ice pack.

Peary retired from the Navy in 1911 with the rank of rear admiral. He died in 1920.

Matthew Alexander Henson, a black, was born on a farm in Maryland in 1867. He was the only American who accompanied Peary when the explorer reached the North Pole in 1909.

Although Peary sent back five support teams on his final dash to the Pole, he kept Henson because, he wrote, "I can't get along without him."

Henson was Peary's invaluable associate from 1887-1909. His sledge driving and hunting skills were considered equal to the Eskimos' best.

Henson died in 1955.

— Vilhjalmur Stefansson, who explored the Beaufort Sea, the last great unknown Arctic area.

Stefansson, often called the "prophet of the north," was born Nov. 3, 1879, in Arnes, Man., Canada.

Of Icelandic descent, he spent a year among the Eskimo in 1906-07, acquiring an intimate knowledge of their language and culture, and forming the belief that Europeans could live off the land in the Arctic by adopting Eskimo ways.

From 1908-12, he and Canadian zoologist Rudolph Anderson carried out ethnological and zoological studies among the Mackenzie and Copper Eskimo in Canada's Northwest Territories.

A 1913-18 Canadian Arctic Expedition helped fill in the map of the northernmost islands of the Canadian archipelago.

Stefansson sledged thousands of miles safely, but when his ship was caught in ice and sank, only nine out of 20 persons survived a 60-mile trek across a rugged ice pack in weather 45-55 degrees below freezing.

In World War II, Stefansson advised the U.S. government, surveyed defense conditions in Alaska, and prepared reports and manuals for the armed forces.

He died in 1962.

The designer of the four stamps showing these five men was Dennis Lyall of Norwalk, Conn.

Lyall also has designed commemoratives which honored Joseph Priestley, issued in 1982; American inventors, a block of four issued in 1984; and Horace Moses, issued in 1985.

He also designed the 20¢ Thomas Gallaudet and 6¢ Walter Lippmann definitives in the Great Americans series.

The art director for the issue was Howard Paine, a design coordinator for the Citizens' Stamp Advisory Committee.

Richard Sennett of the American Bank Note Co. was the stamps' modeler.

ABNC prepared the stamps and contracted J.W. Fergusson and Sons of Richmond, Va., to print them by the gravure process on a leased Champlain press in yellow, magenta, blue, tone black and line black.

The printed stamps were shipped to the ABNC plant in Chicago, Ill., for perforating on L-perforators and processing into post office panes of 50 stamps each.

Marginal markings on each pane include the Copyright,

Bear watchers give oil firms room

R.C.N.

By The Associated Press

Figuring that polar bears can make life a little too tense on drilling rigs, at least one oil company has turned to professional spotters to watch for the powerful ghosts of the Beaufort Sea ice.

Mel Keeney and Bob Jensen recently set up their 4-by-4 shack near a man-made drilling island at Cape Halkett, about 100 miles northwest of Prudhoe Bay. With a hairdryer to keep the windows clear and a small stove to ward off the Arctic cold, their job is to alert oil company crews on a nearby drilling rig of approaching bears.

The two work for Polar Bear Monitoring Services, a small business started several years ago by Fairbanks hunting guide Gary Wallace, Keeney said. He said the firm now employs about a half-dozen monitors.

"We're just hunters and fishermen and outdoorsmen," said Keeney, 42. "We've had close encounters with bears and learned different ways to deal with them."

There are few specific skills needed for the job, but paramount is patience and a long attention span. A polar bear monitor is not supposed to read or listen to the radio while on his 12-hour shift. Instead, he scans the horizon continually.

Amoco Production Co. pays the monitoring firm $31 an hour because it wants nothing to do with the large, white critters. It decided the precaution was necessary, especially in spring when the bears' main food supply—the ringed seal—starts popping up near the drilling sites, said Wayne Smith, Amoco's Alaska manager.

In Canada, where oil companies have been working on the polar ice pack for years, close encounters with polar bears have become common. On islands of the high Canadian Arctic farther east in the Beaufort Sea, and much farther offshore than Alaska companies have been working, polar bears have attacked and killed drilling crew members in recent years.

Jensen, a 35-year-old Nenana resident, advocates frightening rather than shooting the bears. He had ample opportunity recently to practice his scare tactics while stationed at an Exxon drilling structure in Alaska's Beaufort Sea. In 22 days, polar bears approached the rig six times, he said.

One came within 50 yards of the rig and another spent nearly two hours nosing around before lumbering off, he said.

Steven Amstrup of the U.S. Fish and Wildlife Service has studied polar bears in the Alaska Arctic since 1980.

He estimates there are about 2,000 polar bears on the ice pack between Point Barrow and Cape Bathurst, Canada, an area as large as about half of the continental United States. That works out to about one bear every 60 miles of sea ice, "so the chances of bumping into a bear are not all that great," he said.

But the animals are curious and totally unafraid, Amstrup said. "They are clearly the toughest individuals in the valley and don't have to be concerned about anything else."

The bears have not learned to fear man, mainly because any bout with a humans usually ends with a dead bear, Amstrup said. He said the animals must be respected because of their strength and size, but that they are not marauding killers.

If the bears and humans are to co-exist, they are going to have to learn to share the ice, he said. Already, half a dozen artificial islands have been constructed in polar bear territory in the search for oil.

"Last fall, we caught numerous polar bears within sight of two drill rigs, so we are advancing out to their area," Amstrup said. "And when in their world, human beings must take care to stay out of their way.

"Remember, the things polar bears eat are about the size of people."

Greenland to issue semipostal

Greenland will issue a 2.80-krone+50-ore semipostal stamp April 17 showing a man on a fishing bladder.

This is a popular spot in Greenland. A harpoon line is attached to the fishing bladder. The man is then drawn to shore.

Thue Christiansen designed the stamp with the aid of the Greenland Sports Union.

Researchers Draw Back the Curtain On the Mysterious Aurora Borealis

By WALTER SULLIVAN

The New York Times

FAIRBANKS, Alaska — Ever since human beings first settled this region they have been awed by the aurora borealis — towering, rippling, multicolored curtains of light that often hang above this city on clear, dark nights. Yet only recently have scientists been able to demonstrate the forces that control these "northern lights."

In particular the scientists believe they have discovered, through computer simulations and laboratory experiments, the cause of the strikingly uniform folds that often appear in the aurora. Some hope, in addition, to manipulate and "orchestrate" aurora displays by beaming powerful radio waves up from the ground.

Recent tests have also indicated that a related phenomenon, the polar electrojet, a "river of electricity" flowing through the upper atmosphere, may have a practical application. In Norway the electrojet has been used to create extremely low-frequency (ELF) radio waves of the type that the United States Navy would like to use for communication with submerged submarines.

Study of the aurora borealis has been aided by a supersensitive, ground-based video camera that can make extended recordings of the displays, thus bringing their rippling behavior within view of physicists unable or reluctant to spend frigid nights in the Arctic.

The recordings have documented the many forms auroras take, including the rhythmic undulations that led early observers to see them as some form of glowing celestial snake. When Fairbanks is directly under a display, one can look up into a towering cathedral of light whose multicolored walls are more than 100 miles high.

Explanation for 'Pleats'

An explanation for the remarkably "pleated" auroral curtains has emerged from theoretical speculation followed up by computer simulations here and by laboratory tests at the General Electric Company in Schenectady under the near-vacuum conditions in which auroras form.

The auroral curtains are produced by sheets of high-energy electrons magnetically guided from space into the thin atmosphere between 60 and 200 miles aloft. Oxygen molecules glow red or yellow when struck by the electrons, depending on the electron energy. Hydrogen molecules also glow red. Individual oxygen atoms glow green. Nitrogen atoms emit a purple light and, at lower levels, two-atom nitrogen molecules glow pink.

Dr. Syun-Ichi Akasofu of the University of Alaska's Geophysical Institute here explained that the plunging electrons induce an electric field in the electrified air, or plasma, on either side of the auroral sheet. North of the sheet they generate an electric field directed toward the south, whereas on the opposite side the field is directed north.

This causes plasma north and south of the sheet to flow in opposite directions at about 1,400 miles per hour. It is this counterflow, according to Dr. Akasofu, that produces the folds, like swirling eddies along the edge of a river.

The auroral record was further enriched last May when a space shuttle flew close to the southern auroral zone, perhaps even through some of the "southern lights" between Antarctica and Australia. Photographs taken by the astronaut Don Lund show a snaking wall of light, reddish at the top, white in the middle and bluish at the base. Others show a narrow, glowing white "highway" across the southern sky.

Dr. Akasofu, taking with him the new photographs and laboratory results, recently flew to his native Japan at the invitation of Emperor Hirohito to brief him on the findings. The Emperor, Dr. Akasofu said, has had a special interest in auroras.

Early Warning of Disturbances

From observations of solar eruptions that lead to enhanced auroral displays, supplemented by data from spacecraft, he said in an interview, it may soon be possible to warn the Air Force well in advance of auroral disturbances that could affect space missions, radars or missiles.

An antenna system may be able to "orchestrate" an aurora's colorful displays.

Normally the aurora, at any one moment, forms a narrow, globe-encircling band that remains fixed relative to the direction of the sun as the earth rotates beneath it. While invisible in daylight to human eyes the entire oval can be recorded in ultraviolet light from spacecraft.

The auroral oval is centered at the geomagnetic pole in the Canadian Arctic rather than the geographic pole. At local midnight its southernmost part often lies over this city. Twelve hours later, when it is midnight in Europe, the oval has rotated eastward and that same sector lies over Iceland and the Norwegian coast.

When a magnetic storm, following a solar flare, disrupts the earth's magnetic field, the auroral zones can swell rapidly, forming in each polar region a far larger area of radiation hazard.

Low-Frequency Radio Signals

The demonstration that the auroral electric current, or electrojet, can be used to generate extremely low-frequency, or ELF, radio signals has been reported in the British journal Nature.

A station on the ground in northern Norway transmitted extremely powerful high-frequency radio waves into the electrified upper air through which the electrojet flows. This altered electrical conductivity of the air and, since the heating was intermittent, the electrojet was modulated to generate radio signals at such extremely low frequencies as 1,040 and 1,570 Hertz (cycles per second).

Such waves, reflected back and forth between the earth and the ionosphere, can travel great distances with little energy loss and can penetrate more than 30 feet into the sea. The signals generated by the electrojet were received as far away as Lycksele, Sweden, 345 miles to the south.

To make it possible for submarines to receive messages without deploying an antenna that could reveal their positions, the Navy has long supported research on generation of ELF emissions that can penetrate water. Project ELF, a dual transmission facility with a 56-mile antenna at Sawyer Air Force Base in the Upper Peninsula of Michigan and a 28-mile one near Clam Lake, Wis., is nearing completion and has already been able to communicate with submerged submarines.

However, beause ELF waves are 2,000 miles or more in length, to generate powerful transmissions the antenna should be hundreds of miles long. The scale of the ELF Project has been severely restricted by local fears of adverse health effects.

The Navy has supported attempts to generate ELF signals by modulating low-latitude ionospheric currents. In the tests, conducted by Pennsylvania State University, coded messages were sent in this manner over various distances. One was sent from Puerto Rico to the campus at University Park, Pa., using the giant antenna at Arecibo, Puerto Rico, to modulate the overhead current.

Next spring, in a related experiment, an antenna system 30 miles east of here is scheduled to probe the

aurora with extremely powerful radio pulses and may be able to "orchestrate" its colorful displays. The tests are being conducted by Dr. Alfred Y. Wong of the University of California at Los Angeles. He has built a circular array of dipole antennas 680 feet in diameter to generate pulses of 1.8 megawatts at one-second intervals. These, as well as continuous transmissions, are designed to stimulate the auroral plasma and test its properties.

Effect on Power Supply

Another practical aspect of auroral research under way at the Geophysical Institute here concerns the extent to which the electrojet induces currents in long conductors, such as pipelines and power lines. Power companies are concerned that, as their systems grow in the north, this could lead to blackouts. Pipeline operators see a danger of current-induced corrosion.

The Alaskan power utilities are completing a north-south tie linking the coastal power grid centered on Anchorage, with the interior one based at Fairbanks. Auroral-induced fluctuations have already been recorded in the tie linking a coal-burning power plant at the Healy mine near the Alaska Range and Fairbanks.

Although witnesses have reported hearing auroral "sounds," no noises audible to the human ear have been documented. They do, however, generate sound waves far below audible frequencies that have been recorded by nets of microphones based here, in Antarctica and Australia. The manner in which such sounds they are generated is still uncertain.

Computer Age Comes to Eskimos in Canada

By CHRISTOPHER S. WREN
The New York Times

FROBISHER BAY, Northwest Territories — Eskimos need iceboxes too, so 11 settlements in Canada's eastern Arctic are building walk-in freezers to store the game that hunters shoot to feed their families from the land.

But the Eskimos, or Inuit as they call themselves, are taking progress a quantum leap further. The Baffin Regional Council wants to computerize the freezer inventories so that if one hamlet finds itself long on caribou but short on seal, it can trade with another.

In the Arctic, computers are an idea whose time has come, and keeping an inventory of country foods, as local game is called, is only one of the uses envisioned.

"It really is the introduction of a new technology into the North," said Ron Mongeau, executive officer of the Baffin Regional Council. "It won't have the immediate impact of television, but it will have a long-term impact in changing the sociology of the North."

The council was formed in 1977 to coordinate the interests of 14 predominately Eskimo communities on and around Baffin Island. It works as an intermediate layer of government, interceding on behalf of the settlements with the territorial government.

The effectiveness of the Baffin Regional Council has been hampered by the distance between communities in the Arctic. The Eskimos traditionally reach decisions by consensus, and it has been costly and time-consuming to fly the elders to meetings in Frobisher Bay, the largest town.

The inefficiency of the postal system makes it hard for hamlets to stay in touch. Mr. Mongeau recalled one letter he mailed from Frobisher Bay that took five weeks to reach Grise Fiord, the most northerly settlement.

By contrast, the telephone system, which uses a satellite, is excellent. But communities have little money beyond what the Government provides and cannot afford frequent long-distance calls.

Computers seemed one way to surmount such problems. The challenge was to find one that would not daunt people with a high school education at best. They needed softwear not only in English but also in Eskimo.

The council chose the Apple Macintosh, a portable computer that uses images to convey commands.

Ed Horne, a schoolteacher in Lake Harbor, a settlement on Baffin island, wrote a softwear program with fonts recreating the lines and circles of the Eskimo alphabet.

The council is spending $4,300 to equip every settlement with computer hardware, including a telephone modem, by the end of March. Computers are already in use at council headquarters here and in Arctic Bay, whose Mayor, Phillip Kalluk, uses his computer in Eskimo.

The computers will be used to audit spending of funds, draw up reports and financial statements and exchange information, all for the price of a telephone call at off-peak hours.

"We can drop correspondence into the computer in the day and set a timer on the modem so we can send when the telephone rates are lowest at night," Mr. Mongeau said.

He acknowledged that computers would not provide an immediate panacea for overcoming the historical isolation of the Eskimos. But they have adopted easily to other machines like snowmobiles, which replaced dogsleds as the common mode of winter transportation.

The Arctic temperatures, which can plunge beyond 50 below zero, pose only a temporary nuisance. "We have popped frozen disks into the computer and get absolute garbage," Mr. Mongeau said. "But if you let the disks warm up, you won't have difficulty."

Island of ice to be oil rig pad

ANCHORAGE, Alaska (UPI) — The first oil drilling pad ever constructed entirely out of ice is being built about 300 miles north of the Arctic Circle, just beyond Alaska's northern coast, oil company officials said

Amoco Production Co. will pump a minimum of 265 million gallons of sea water from the Beaufort Sea and spray it into the air, where it will freeze into ice crystals that will settle on the frozen ocean, said spokesman Ted Neptune in a telephone interview from the company's Denver office.

Temperatures must remain below zero for the technique to work, Neptune said. He said oil companies experimented with a smaller ice island last winter, but this will be the first ice island ever built to support an exploratory oil drilling rig.

The ice island is to be 950 feet in diameter and extend 20 feet above sea level. The ice mass will sink to the ocean floor where it will be grounded. The depth of the ocean at the site is 25 feet.

When Amoco is finished looking for oil, it will remove the rig and living quarters and let the ice melt — leaving no trace of the frozen drilling pad.

The $22 million project includes $9 million alone for constructing the ice island, but Neptune said that cost represents "one-third to one-half what it would cost to build a gravel island."

Other firms looking for oil in the shallow waters of the Arctic Ocean's Beaufort Sea beyond Alaska's northern coastline have constructed gravel islands for their drilling rigs.

Buildings that generate heat and have significant weight will be elevated with a 2-foot air space between the ice and the bottom of the building, Neptune said, and fans will blow the warm air out.

6 Reach North Pole, With Only Dogs for Help

By ERIK ECKHOLM

The New York Times / May 3, 1986

In a grueling test of endurance and self-reliance, six American and Canadian explorers reached the North Pole yesterday evening after nearly two months of walking, jogging or skiing over the rugged Arctic ice pack. They were the first people to reach the Pole assisted only by dogs since Robert E. Peary planted a flag there in 1909.

The explorers, accompanied by 21 huskies pulling two sledloads of food, fuel and equipment, reached the top of the world at 6:50 P.M. Central daylight time (7:50 P.M. Eastern daylight time), 56 days and 500 miles from their starting point.

"This Pole trip is probably the ultimate in self-reliance," Will Steger, a 41-year-old former science teacher from Minnesota who led the expedition, said in February before beginning the perilous journey. In the trip across the ice, two of the team's original eight members were airlifted out because of injuries.

'On Edges of Our Seats'

"Everyone is ecstatic because we've been sitting on the edges of our seats now for two days hoping that we'd hear from them," said Jennifer Kimball, of the Fiberfill Division of E. I. du Pont de Nemours & Company, a major sponsor of expedition. "We've heard from the team that it's very overcast at the Pole, and therefore we can't pick them up until it is clear."

Three two-engine Twin Otters at Resolute Bay, in Canada's northern archipelago, 1,100 miles from the Pole, were awaiting orders to make the 24-hour round trip to pick up the explorers and their dogs.

Seven men, one woman and 49 dogs set out with five sleds on March 8 from Ward Hunt Island, the northernmost tip of Canada 500 miles from the Pole.

70 Degrees Below Zero

Two days earlier, an attempted start was abandoned in the face of 50-foot ice ridges, winds and temperatures 70 degrees below zero.

In a reluctant concession to modern technology, made to protect both humans and dogs, the group carried a radio and a satellite homing device that could reveal their location. As planned, 28 of the dogs were airlifted out as the load of food lightened, and empty sleds were burned as fuel and the dogs' services became unnecessary. Early Arctic explorers such as Peary ate their redundant dogs.

One man was picked up along with seven dogs April 2 after he injured his ribs while pushing a sled over an ice ridge. A second man was airlifted to safety April 16 with frostbitten feet. The rescue planes did not bring any new provisions and gave the explorers, who were navigating by the sun, no information.

Shifting Pack Ice

The dogs pulled supplies in 16-foot-long wooden sleds loaded with 800 pounds of provisions each. The humans trotted or skied alongside. The group traveled about 12 hours a day, keeping to their own schedule in the virtual 24-hour sunlight of Arctic spring.

The North Pole, which is covered with shifting pack ice, has been visited many times by airplane, snowmobile and submarine. But no one has made the trip without mechanical assistance since Admiral Peary, an American explorer who claimed that on April 6, 1909, he was the first man to stand on the North Pole. Athough some historians have questioned whether Peary stood precisely on the Pole, most find his claim more credible than that of Frederick A. Cook, who said he had made it nearly a year before.

The Steger team established that they had reached the Pole by using celestial navigation instruments that showed the sun was circling them at a constant angle. This only occurs at the earth's poles.

Clouds Are Enemy

With the magnetic north behind them, the team navigated with age-old tools such as the sextant, which explorers have used for centuries to determine the angle of the sun and stars. Clouds were their enemy, making readings impossible and sometimes forcing them to stop to avoid wasting motion in the wrong direction.

After slow going over rugged ice for their first 10 days, the group made good progress, averaging 20 miles a day, until last Wednesday, according to James Gasperini, who talked with the explorers occasionally by radio and tracked their progress with the aid of the Canadian military aircraft.

Mr. Gasperini, speaking by telephone on Friday from Resolute in Canada's northern archipelago, said that as the team approached the Pole, they progressed only three miles on Wednesday and six on Thursday, according to information gained from the satellite beacon.

Mr. Gasperini said aerial observations of conditions near the Pole suggested that the group might have been delayed by 30-foot ridges of ice, pushed up when plates of ice crashed and buckled.

Such pressure ridges are one of the main obstacles to Arctic travel. Dog sledders must chop a trail over them if they are too wide to go around. Traversing ridges would have been especially strenuous for the explorers last week, Mr. Gasperini said, because to save weight they had thrown away most of their tools, keeping only a pick, an ax and a shovel.

The travelers might also have been held up by patches of open water called "leads," which can be miles long and range in width from inches to miles. If such cracks in the ice, which open unpredictably in the spring warmth, are narrow enough, a sled can be used as a bridge. Otherwise, travellers must wait for the water to freeze over.

The human travelers lived on a bland, high-fat diet of 7,000 calories a day of pemmican, butter, cheese, oats, peanut butter and energy bars.

The dogs ate seal and walrus meat they had carried along, "science diet" dog food and pemmican. The group did no hunting.

Temperatures ranged from more than 60 degrees below zero to minus 5 or 10, Mr. Gasperini said. The Du Pont Company, which along with the National Geographic Society sponsored the expedition, supplied special clothing designed to preserve warmth while preventing retention of moisture from sweat; wet clothing, which then can freeze, is one of the greatest hazards of polar travel.

The dogs, Alaskan and Eskimo huskies, relied on their own coats. "The dogs are totally at ease," Mr. Gasperini reported. "they actually held up better than anyone."

Reaching the North Pole were Mr. Steger, Paul Schurke, the co-leader, and Anne Bancroft, all from Minnesota, Geoff Carroll from Alaska, and Brent Boddy and Richard Weber of Canada. The two members who were rescued were Robert McKerrow, of New Zealand, and Robert Mantell, of Alaska.

US scientist lauds SA fossils

The South African Museum's fossil collection is probably the finest in the world for the intermediate period prior to the evolution of mammals. This is the view of a palaeontologist from the University of California, Berkeley, Dr Tim Rowe, who recently visited Cape Town as a guest of the South African Museum.

Dr Rowe's special subject is the early evolution of mammals. He believes mammals appeared about 150 million years ago and are therefore some 40 million years "younger" than was previously supposed. He is also researching the patterns with which evolutionary transformations are recapitulated in the growth of all mammals, including humans; particularly in the months between conception and birth.

600 Applaud Returning Arctic Explorers

ST. PAUL, May 4 (AP) — Four members of the six-person team that reached the North Pole Friday after a 56-day, 500-mile trek received a heroes' welcome here today.

"What a fantastic, miserable and wonderful trip," one of the team members, Geoff Carroll, told a crowd of 600 people who waved American flags and cheered as the team's jet landed.

"We all love you," Gov. Rudy Perpich told the team. "Congratulations on a wonderful journey."

"We're overwhelmed," said Will Steger, the team's leader. "The experience taught us the powers of faith and perserverance."

Using dogsleds to transport provisions and navigating only by sextant, they had duplicated the 1909 race to the Pole by Robert Peary. The expedition's log is to be compared with Peary's journal and with that of his arch rival, Dr. Frederick A. Cook, who said he had beaten Peary to the Pole by a year.

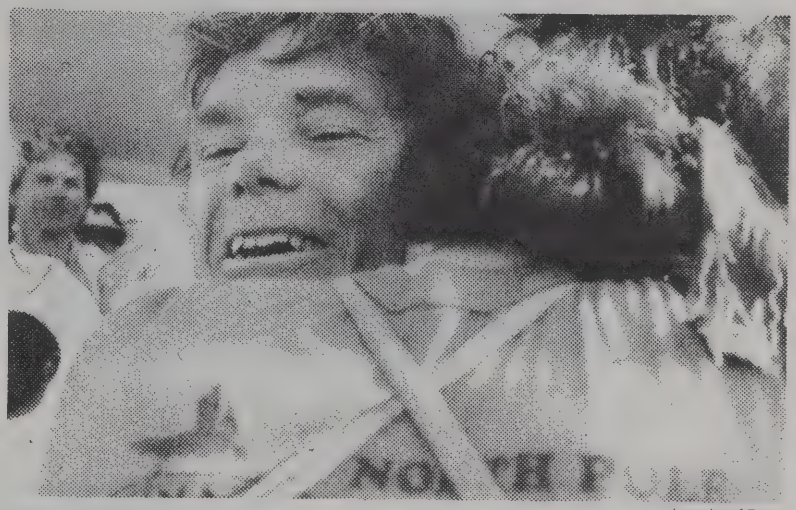
The four flew here from their base camp at Resolute Bay in Canada's Northwest Territories, where they had been flown Saturday from the Pole.

The adventurers, who had been two months without news, were shocked on arriving at Resolute Bay to learn of the bombing of Libya by the United States and of the accident at a nuclear power plant in the Soviet Union.

Besides Mr. Steger and the expedition's co-leader, Paul Schurke, both of Ely, Minn., and Mr. Carroll, of Juneau, Alaska, the expedition included Ann Bancroft of Sunfish Lake, Minn., and Richard Weber and Brent Boddy, both of Canada. Two others who started the trek, Robert Mantell of Anchorage and Robert McKerrow of Anakiwa, New Zealand, were injured on the way to the Pole and had to be evacuated by air.

The adventurers brought sad news. Critter, a lead sled dog, died just before the expedition reached its goal. Critter was owned by Mr. Mantell, who was evacuated April 16. Team members said Critter never pulled well after his master left and died last Wednesday of unknown causes.

Members of the team planned to travel to the Washington Tuesday for a news conference at the headquarters of the National Geographic Society. The society and the Fiberfill Division of E. I. duPont de Nemours & Company were major sponsors of the expedition.



Associated Press

Will Steger, leader of the expedition to the North Pole, getting a hug from a supporter after four of the explorers arrived in St. Paul.

Explorer Describes Grueling Trek

By CHRISTOPHER S. WREN

The New York Times

OTTAWA, May 5 — After Will Steger enjoyed his first hot shower, change of clothes and proper meal in nearly two months, he thought about what he and five comrades had just accomplished: the first confirmed trek by dogsled without resupply to the North Pole.

Mr. Steger said the polar expedition "took all of my physical, spiritual and mental resources — I had to hone these all down and strive for perfection."

"The first couple of weeks were just ungodly cold," he said as he talked by telephone from Resolute in Canada. "I've never had anything like it." The temperatures plunged to 70 degrees below zero before the team's thermometer stopped working.

Then came two severe blizzards: "There were 60 mile an-hour winds, but the temperature was 45 below." Mr. Steger estimated the wind-chill factor at "who knows? — 120 below?" The six explorers sat out the blizzards in their tents and later were delayed once more by "whiteouts," with visibility so bad they could not navigate.

Mr. Steger, a 41-year-old former high school teacher from Ely, Minn., had logged 12,000 miles of Arctic travel, much of it solo, before he set off for the North Pole. He and seven companions headed north on March 8 from Ward Hunt Island, at the northernmost tip of North America, with 49 dogs and five wooden sleds piled with supplies.

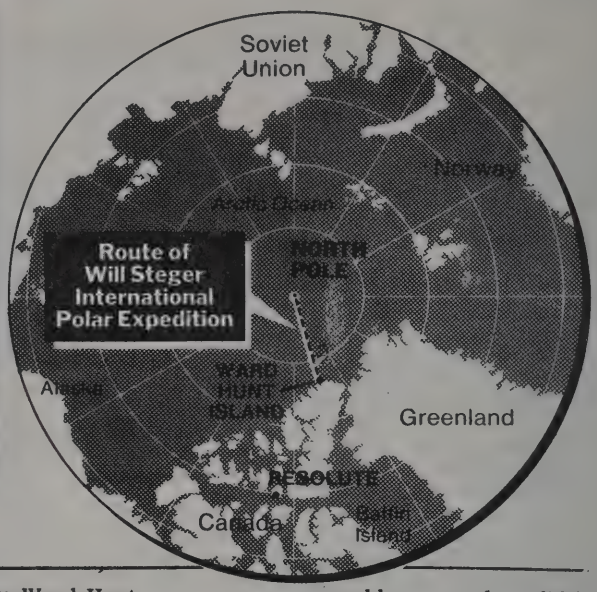
Last Thursday, after 55 days of intense cold and frequent encounters with ice ridges up to 40 feet high and open patches of freezing water, six of the explorers and 20 dogs arrived at the North Pole. They then spent a day establishing their location with a sextant that showed the sun at the same angle.

Two injured team members and 28 exhausted dogs had been evacuated earlier by aircraft. A favorite lead dog collapsed and died. The Steger International North Pole Expedition refused to be resupplied and reached their goal with barely 10 pounds of food among them.

The Steger party is the first to reach the top of the world without mechanical transportation since Adm. Robert E. Peary did so on April 6, 1909. Frederick A.

The New York Times / Christopher S. Wren

Ann Bancroft with dogs used in North Pole expedition.



Cook disputed Peary's claim to have discovered the pole, however, contending that he beat the Admiral by nearly a year, reaching it on April 21, 1908.

But the Steger team, four Americans and two Canadians, was the first to be confirmed at the North Pole, by both satellite reading and overflying aircraft.

The explorers included Ann Bancroft, a 30-year-old physical education teacher from Minnesota who was the first woman to trek there unsupported. At one point she fell in, up to her waist, in one of the patches of open, freezing water, or "leads," and was quickly hauled out. At those temperatures wet clothes can freeze almost instantly and cause hypothermia. She changed to dry clothes in a hastily erected tent, and the team headed off again.

While they traveled north along a 75-degree longitude, Paul Schurke, a 30-year-old Minnesotan who was co-leader of the expedition, took daily readings with a hand-held sextant, which measures the angle of the sun and other celestial bodies to determine the latitute and longitude.

He led the team to within a hundred yards of the North Pole with the sextant. A radio signal relayed to a satellite confirmed to the expedition headquarters at Resolute that their location was latitude 89 degrees, 59.9 minutes — a scant second away from the 90 degrees of true north, Mr. Steger said. The explorers zigzagged around the drifting ice to make sure they crossed the northernmost point on earth.

"It's phenomenal — it's beyond luck," said Mr. Steger, who credited Mr. Schurke with the feat.

In a telephone interview from Minneapolis, Mr. Steger was asked to expand on his reasons for subjecting himself to such exquisite misery:

"I do these things for self-growth. It's an exercise not just of the physical but of the growth of finer powers. It's the challenge and adventure, I can't deny it — an exercise in excellence."

The air distance from Ward Hunt Island to the North Pole is 500 miles, but Mr. Steger estimated that they traveled at least 900 miles because of detours forced by pack ice that had collided and buckled up into ice "pressure ridges."

On skis, they scouted routes through the ridges, but the dogs could not always haul their sleds, laden with half a ton of supplies each, up the slopes. So each sled had to be hauled by two dog teams instead of the usual one. Describing the double-teaming, Mr. Steger said "we would bring the loads forward seven or eight miles" and then go back with the dogs to pick up the next group of loads.

This meant that "for the first 120 miles, we traveled 360 miles," Mr. Steger said.

"There were times when I almost think that what we were doing was impossible," he said.

On March 17, a team member from New Zealand, Bob McKerrow, broke several ribs when a bouncing sled slammed into his chest. He was evacuated out by plane along with seven dogs, some of which had been hurt in dogfights.

A couple of weeks later, with 300 miles to go, Robert Mantell, a 31-year-old Alaskan, suffered severe frostbite of his feet. "He was in extreme pain," said Mr. Steger, who had him evacuated, too.

As the food, which accounted for most of their load, was eaten, the team members burned two sleds for firewood and flew a third out to a museum along with the weakest dogs. Admiral Peary and Dr. Cook killed their spare dogs for food.

Mr. Steger had bred some of his dogs from Eskimo and Alaskan stock, with a little wolf mixed in for intelligence and endurance. Mr. Mantell brought his lead dog from Alaska, but most of the animals were leased from two Eskimo communities in Canada.

"The Eskimo dogs really were stars when the workload was heavy and the weather was cold," Mr. Steger said. But on the flatter ice, "doing 30 miles a day," he said, "I would say my dogs did better. They were out front all the time."

The explorers traveled at least 12 hours a day. "We kept the dogs as strong as possible," he said. "The food was real short at the end. They were about as tired as we were."

A day before they reached the pole, he said, Mr. Mantell's Critter, a friendly lead dog of which team members were especially fond, went into convulsions and died. "We couldn't figure out why," Mr. Steger said. "He had a good appetite and been eating well."

Mr. Steger worked several years planning the trek, which he estimated cost $350,000 in cash and an additional $400,000 in donated supplies and services.

He devised a high-fat diet of 7,000 calories a day, nearly three times the intake for a normal adult. It featured butter and peanut butter, cheese, noodles and oatmeal cooked up in two bland meals.

The high fat was meant to provide a slow but consistent release of energy. But he said, "I had a bad reaction to it for the last three weeks — stomach cramps and some diahrrea." For his next expedition, in which he hopes to cross Antarctica, he said he would modify the diet in times of less-severe temperatures. "I would probably have a couple of biscuits during the day, maybe more variety — rice instead of all noodles," he said. "We needed more dry meat. Two ounces of dried meat would have gone a long way."

Even so, Mr. Steger reported, nobody lost too much weight. "Everyone is strong hard and lean," he said. "It's not just walking 30 miles; it's pushing and grunting and hauling."

Blood samples taken at the North Pole will be analyzed this week at the University of Minnesota to check chloresterol level.

Mr. Steger said the team stayed clear of "shear zones," treacherous areas where the ice is cracked and pulled apart by ocean currents.

When they encountered the "leads" of exposed water, they had to wait for

Little Diomede — population of about 140 — clings precariously on a steep, rocky mountainside in Bering Sea

LITTLE DIOMEDE ISLAND — Spring usually arrives late at Little Diomede Island, a barren, rocky outcrop in the middle of the Bering Strait.

But the island's 154 residents take winter in stride, using the Arctic ice as a platform from which to harvest seals, walrus, crabs, fish and polar bears.

Despite its remoteness, Diomede gets a trickle of visitors. In summer, a few tour boats tie up at a landing below the village, comprised of several dozen wooden buildings rising steeply up a treeless, windswept slope.

Many of the visitors come to buy ivory carvings turned out by the villagers, mostly Yupik eskimos.

Others, in winter, land on a runway carved from Chukchi Sea ice to buy some of the sweet, succulent king crabs harvested near the island.

There's only one telephone in the village. That's located in a combination firehall and post office. The general store, about 100 feet away, doubles as a meeting place and sales room.

Smiling, bubbling children are indulged in the store for a few minutes before being shooed outside to play on their plastic sleds or to throw snowballs at each other from rooftops.

Little Diomede is one of America's last outposts. The island is separated by 2½ miles and the International Dateline from Big Diomede, which is Soviet territory.

But the villagers shrug off the Cold War as they do the cold weather, going about their business of surviving in the harsh Arctic environment.

---

refreezing. "On one lead about 30 yards wide, we used a block of ice and ferried the dogs across," Mr. Steger said.

The farther north they traveled, the more they worried about the ice breaking up in the spring thaw. "The last 30 miles were bad," Mr. Steger said. "You could see the ridges moving on you, opening and pushing and grinding."

To lighten their loads, the team jettisoned two sleeping bags, because ice accumulation had increased their weight from 15 to an estimated 50 pounds apiece. The four sleeping bags left were zipped together in two pairs, each shared by three people. "It was very tight, but we saved a lot of weight," Mr. Steger said.

He praised the synthetic insulation provided for the clothing and sleeping bags by E.I. du Pont de Nemours & Company, a principal expedition sponsor, Unlike down, the insulation, even when wet, held in body heat.

The expedition leader said the team members worked well together, though they suffered some "tent fever" toward the end.

Geoffrey Carroll, a 35-year-old Alaskan, has called the trip "fantastic, miserable and wonderful," and Mr. Schurke has likened the pushing of dogs and sleds up and over the ridges to "pushing cars out of snowdrifts 12 hours a day."

Two Canadians, Brent Boddy, 31, and Richard Weber, 26, completed the team.

"I'm starting to feel an achievement and realize just what we have done," Mr. Steger said. "But what I come out of the trip with is, I guess, humility and thankfulness. I was totally amazed at the power of faith and perseverence. I had such faith in the people with me and the millions of people at home. I knew this was what was going to make the Pole. It was faith.

"It was an incredible experience and humbling all the way through."

Ivan Papanin, Explorer, Dies; Led Soviet Ice-Floe Research

By THEODORE SHABAD

The New York Times / Feb. 7, 1986

Ivan D. Papanin, the Soviet polar explorer who commanded the Russians' first ice-floe station in 1937-38 in one of the more daring exploits in polar history, died Jan. 30 in Moscow. He was 91 years old.

One of the best known public figures in the Soviet Union, Mr. Papanin was the last survivor of the four-man crew that drifted for nine months from the North Pole to the vicinity of southeast Greenland. The drift, which ended in a dramatic rescue as the floe threatened to break up in warmer water, was front-page news around the world.

Ice-floe research stations have become routine since then, with the Soviet Union regularly operating two or three at a time.

All four crew members of the first station received the title of Hero of the Soviet Union, the nation's top military award, and went on to hold high positions in science and Government. Pyotr P. Shirshov, the crew's marine biologist, who became Minister of the Merchant Fleet, died in 1953; Ernst T. Krenkel, radio operator, who had spent time in the Antarctic with Adm. Richard E. Byrd, died in 1971, and Yevgeny K. Fyodorov, geophysicist, died in 1981.

Mr. Papanin, in the book "Life on an Ice Floe," published in New York by Messner in 1939, described how the four men and a dog, Jolly, were deposited by plane on the ice in May 1937, and found themselves and their tents in melt water in summer and in temperatures of 50 below zero Fahrenheit in winter before they were rescued by icebreakers in February 1938.

After a triumphal reception in the Kremlin, Stalin made Mr. Papanin head of the Northern Sea Route Administration, a Government agency that operated shipping and research stations along the northern Siberian coast. In that capacity, Mr. Papanin led an expedition in January 1940 to free the icebreaker Georgi Sedov after it had drifted for 26 months across the central Arctic, trapped in ice. The rescue operation earned Mr. Papanin a second title of Hero of the Soviet Union.

Born in 1894 in the Crimean naval base of Sevastopol, the young Papanin went to sea at an early age and served as a sailor on one of the czarist naval vessels that had a crew mutiny at the time of the Bolshevik revolution in 1917.

Starting in 1932, he devoted himself to Arctic exploration. Before being named commander of the ice-floe station, he headed polar research stations at Tikhaya Bay on Franz-Josef Land and at Cape Chelyuskin on the Siberian coast.

Named Rear Admiral During War

In World War II, Mr. Papanin played a key role in Arctic shipping operations, and was given the rank of rear admiral in 1943.

In 1948, he became associated with the Academy of Sciences, serving as a deputy director of the Oceanography Institute and, after 1951, as the head of marine research expeditions. From 1952 to 1972, he was also director of the academy's Institute of Biology of Inland Waters.

Mr. Papanin held the degree of doctor of geography, and from 1945 to his death was the chairman of the Moscow branch of the Soviet Geographical Society, which has its headquarters in Leningrad.

Among his many awards, in addition to the double title of Hero of the Soviet Union, were nine Orders of Lenin, the Order of the October Revolution and two Orders of the Red Banner.

Ahmaogak hot on Eskimo garb

Times Juneau Bureau

JUNEAU — North Slope Borough Mayor George Ahmaogak will take his seal skin mukluks and lambskin parka over the U.S. military's best clothing issue anytime he's tramping across Antarctica ice fields.

Ahmaogak, who lives in Barrow, was invited by the National Science Foundation to test cold weather survival gear on the world's southernmost continent. He spent the last two weeks in McMurdo, Antarctica, comparing Eskimo garb with survival gear used by the military.

"They really need good clothing," Ahmaogak said. "Parkas and warm pants. I'll stick with mine anytime."

Ahmaogak, who is a whaling captain when he's not running the nation's northernmost government, said the science foundation needs to improve much of its survival training program. He said the scientists could learn something from the Eskimos in dealing with dehydration, frostbite, and shelter and food requirements.

The mayor said a team of 20 people flew from Christchurch, New Zealand, to take part in the experiments.

Ahmaogak said he'll make an official report to the National Science Foundation later this year.

Modern technology helps old custom

Associated Press

FAIRBANKS — Natives are using state-of-the-art technology to help them in their primitive pursuit of whales off Alaska's northern coastline, and it seems to be helping.

The whalers are using satellite images to help them find open water where migrating bowhead whales might be found.

Barrow residents have landed seven bowhead whales during the past month. That's nearly twice the number they've caught in a single whaling season in eight years, says Jana Harcharek, office manager of the Alaska Eskimo Whaling Commission.

Harcharek attributes at least part of the whalers' success this season to pictures of the coastline taken from a satellite circling more than 450 miles above the Earth.

The whaling commission ordered the photographs from the Geophysical Institute at the University of Alaska-Fairbanks.

The black-and-white satellite images show where leads of open water penetrate the ice along the frozen coastline, says Greta Burger, a research aide at UAF.

"The photos give whalers tidbits of information like where the ice is breaking off and where one might think about setting up camp," Harcharek says.

The photos are processed at a satellite tracking station owned by the National Oceanic and Atmospheric Administration on Gilmore Creek near Fairbanks.

Through a program called "Quick Look," researchers can process images of the coastline and distribute them to customers within a few hours after the satellite passes overhead, Burger says.

The whaling commission paid $125 for each set of satellite images. The commission ordered three sets, but were able to inspect only two. "The third day was so cloudy, you couldn't see anything," Burger says.

Although the bowhead whale is considered an endangered species, Alaska natives are allowed to take a limited number each year for subsistence purposes. Quotas are set by the International Whaling Commission

After 14 months in Antarctica, the 26th South African National Antarctic Expedition recently returned to South Africa aboard the **SA Agulhas.** *On landing in Table Bay harbour they commented that it would be difficult to adapt to Cape Town's "tropical heat" after having grown accustomed to working in temperatures dipping as low as minus 45 degrees Centigrade.*

U.S. Submarines Meet at Pole

WASHINGTON, May 23 (UPI) — Three nuclear-powered submarines surfaced together this month at the North Pole on a mission that signaled a reinforced United States submarine presence under the Arctic ice pack, Navy officials said today.

The operation by the attack submarines Hawkbill, Ray and Archerfish comes at a time when Soviet submarines with intercontinental-range nuclear missiles have been increasingly exploring the Arctic depths from which they could launch weapons against the United States in the event of war, the officials said.

The Pentagon announced that the three attack submarines linked up and surfaced at the North Pole May 6, but offered few details about their mission.

"The mission of the submarines was to collect scientific data and test submarine force readiness under Arctic conditions without logistics base support," a Pentagon statement said. The announcement was held up until the three submarines returned to their home ports, Navy officials said.

They said the mission involved locating underwater currents to determine where cracks in the ice may develop and experiments to determine how torpedoes and sonar and other anti-submarine warfare gear operate in frigid temperatures.

Soviets see big future for Arctic

By Andrei Baranovsky, economist, Novosti Press Agency

According to Soviet economist Abel Agenbegyan, the development of the Arctic is the largest economic program for the future. Year-round navigation is essential for this development.

The Northern Sea Route Administration operates many ships specifically adapted for arctic navigation. They transport cargo from Murmansk in the west to the Port of Pevek in the east.

The use of aircraft, meteorological stations and special polar stations all help ships to navigate the ice-covered shipping lanes, but navigation along the Northern Sea Route remains difficult.

Cargo ships are usually lead by powerful icebreakers. The fleet of Soviet icebreakers includes three nuclear-powered vessels. The LENIN was built 25 years ago. Its 44,000 hp engine capacity and displacement of 15,300 tons were unmatched at that time. The LEONID BREZHNEV was built 10 years ago.

The third icebreaker, SIBERIA, will soon be joined by the ROSSIA which is under construction. THE ROSSIA, with a displacement of 25,000 tons and 75,000 hp engine capacity, will make her maiden voyage in 1986.

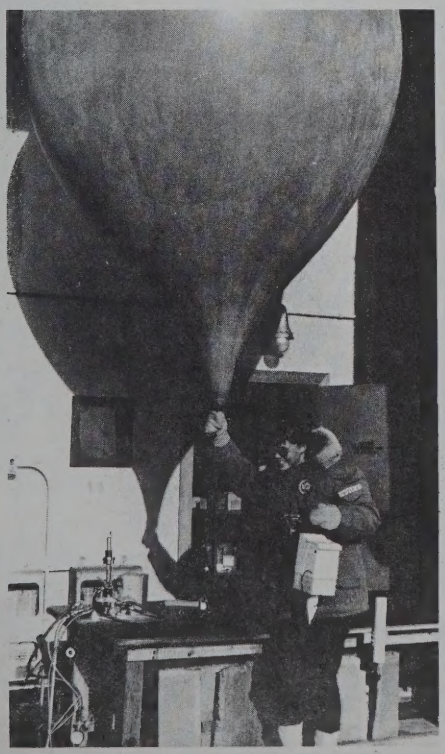
Before the advent of nuclear-powered icebreakers, navigation of the western section north of the Soviet Union lasted only five months of the year. Year-round navigation in this section of the Northern Sea Route is now possible.

The emergence of a new type of cargo ship has increased prospects for development of the Northern Sea Route. These ships are able to carry special floating cargo containers. Each container can carry 376 tons, and the ship's on-board crane can load or unload a single container in 20 to 30 minutes.

OFFSHORE RESOURCES, Vol. 4 No. 2, March/April, 1986

At Amundsen-Scott South Pole Station Robin Moyle helps meteorologists with daily weather readings by releasing an instrumented weather balloon.

U.S. Navy photo by Caulkins.



The stamps of the Australian Antarctic Territory are popular with collectors and noncollectors alike, something to be considered by the investor.

AAT stamps attractive

It hasn't produced a lot of stamps. It isn't a place visited by hosts of tourists every summer. There isn't much to do there, and the climate might not exactly attract surfers and blanket-party types.

In spite of all those negatives, the Australian Antarctic Territory manages to attract one species which is of common interest to readers of this page: stamp collectors and investors.

"I don't know," said one AAT enthusiast the other day, "it's just a romantic kind of place, stuck off down there at the end of the world. There's a kind of mysfery about it that makes it interesting to get the stamps."

If popularity among philatelists and nonphilatelists alike were the chief criterion for stamp investment, then there would be a whopping big market for AAT issues.

Because not only are collectors fascinated by these stamps, but also there are many noncollectors who buy the stamps just because of their interest in the place.

Even some of the new issues provide good investment potential because they tend to rise rather rapidly once the original supply is sold out.

A case in point is the 1983 Wildlife se-tenant strip of five which features inhabitants of Macquairie Island (Scott L55), a part of the territory which has been a wildlife sanctuary since 1933.

The 1908 and 1909 South Pole exploration team leaders are featured on the set, as are other designs reminiscent of polar investigations.

Perhaps third in order of desire to acquire would be Scott L23-34. This is a handsome set of 12 values issued Aug. 15, 1973, and featuring for the most part fauna of the region.

This set is not uncommonly found, although it is believed that the printing for the total set was quite conservative. Right now it can be purchased for close to $10-$13 MNHVF.

Two other sets are probably important to the investor. The first is Scott L19-20. Issued June 23, 1971, this pair of stamps featuring snow formations and pancake ice symbolized the tenth anniversary of the signing of the Antarctic Treaty, an agreement which guaranteed — or at least promised — the peaceful use and continued scientific investigation of the territory.

While the signing of the treaty was amicable, the competition for control and exploration of the area has not been. This set now costs less than $10 in MNH condition.

The final recommended set is the very popular Ships issue, an extended issue which saw the light of day variously for 1974 to 1981.

The set depicts ships whose history has intermingled with the events surrounding the discovery and exploration of the territory.

Of course, ships and vessels remain a very strong topical theme for collectors, and this set is expected to see increasing prices over the passage of time.

Right now it, too, can be bought for less than $10 in MNHVF condition.

What I would strongly recommend to collector/investors is that they go back and, if they can get over the hump of the one expensive set, manage a complete collection of the "country."

To be sure, some of the singles are inexpensive and may not double or triple in value, but it is, as our friend said, a most romantic place. ◘

Girl Scouts visit Antarctica

RICHARD EVELYN BYRD
REAR ADMIRAL UNITED STATES NAVY
OCTOBER 25, 1888 - MARCH 11, 1957
I AM HOPEFUL THAT ANTARCTICA IN ITS SYMBOLIC
ROBE OF WHITE WILL SHINE FORTH AS A CONTINENT
OF PEACE AS NATIONS WORKING TOGETHER THERE
IN THE CAUSE OF SCIENCE SET AN EXAMPLE OF
INTERNATIONAL COOPERATION
TO ALL WHO FOLLOW IN ADMIRAL BYRD'S FOOTSTEPS
THIS MONUMENT IS DEDICATED
NATIONAL GEOGRAPHIC SOCIETY

U.S. Navy photo by Porbansky.

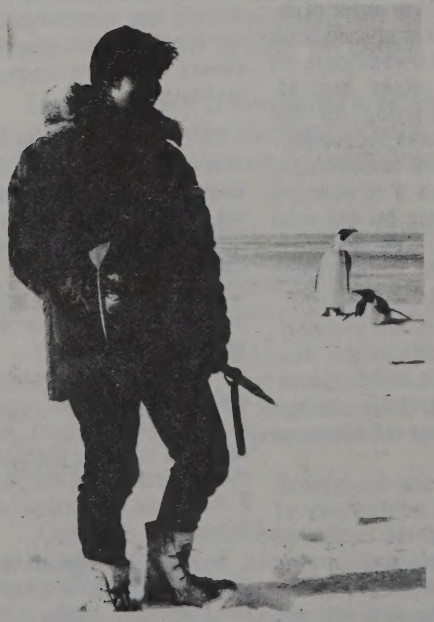
During the 1985-1986 austral summer, two Girl Scouts, Karen Prentice (alternate) and Robin Moyle (selectee) participated in the U.S. Antarctic Program. These two young women were selected to participate in the antarctic program by the Girl Scouts of the United States after a national competition. In this photograph Karen (left) and Robin (right) stand near the Richard Byrd memorial at McMurdo Station.

In Taylor Valley, Karen Prentice chips ice from a hole used by divers working in Lake Hoare.

U.S. Navy photo by Vaughn.

Two emperor penguins watch Girl Scout Robin Moyle at the sea-ice edge.

U.S. Navy photo by Caulkins.



Robin Moyle and NSF geologist Anton Inderbitzen display the National Science Foundation flag at Amundsen-Scott South Pole Station. The geodesic dome, which houses the buildings at the U.S. station, and "skylab" can be seen in the background.

U.S. Navy photo by Caulkins.